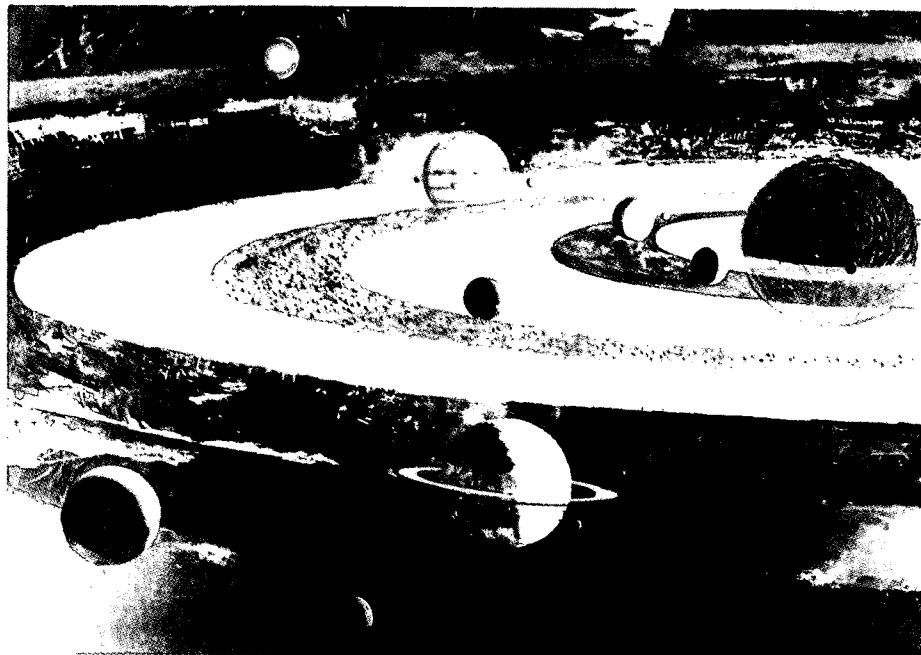


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Support Requirements For Remote Sensor Systems On Unmanned Planetary Missions

APPENDIX A Support Requirement Summary Tables

SD 70-375-2



Space Division
North American Rockwell

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Support Requirements For Remote Sensor Systems On Unmanned Planetary Missions

APPENDIX A Support Requirement Summary Tables

Phase III of Contract NAS2-5647

June 1971

Prepared for

Advanced Concepts and Missions Division
National Aeronautics and Space Administration



Space Division
North American Rockwell

Sensor Support Requirements Summary

Sheet Number 1-1

Sensor type TV CAMERA Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>123</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>126</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
	Page C - <u>127</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>128</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
	Page C - <u>130</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____

Total observation worth = 3.10

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1.0	1.0
Characteristics	Max Alt	Max Alt
Time to periapsis (sec)	-2.94E04	-9.65E05
Latitude (deg)	-3.56	8.7
Longitude (deg)	178.0	-74.0
Sun angle (deg)	33.2	6.4
Support requirements		
Mass (kg)	193.5	2.61
Average power (w)	57.3	5.73
Length (m)	6.54	3.52
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	6.11	0.04
Data rate (bit/sec)	1.07E07	700.0
Pointing accuracy (deg)	0.042	0.019
Pointing stability (deg/sec)*	0.71	0.60
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Pitch rate limit (deg/sec)	1.29E-03	4.95E-04
Capability parameters		
Maximum wavelength (λ_M) (μ)	0.7	(Same)
Minimum wavelength (λ_m) (μ)	0.4	(Same)
Spectral resolution ($\Delta\lambda$) (μ)	0.02	(Same)
Spatial resolution (m)	2400.0	6.0E06
Angular resolution (deg)	3.0E-04	3.0E-03
Exposure time (sec)	0.037	1.00
Field/view length (km)	1.72E06	1.9E08
Swath width (km)	1.72E06	1.9E08
Area/frame (%)	6.45E-03	50.0
Total area (%)	24.0	50.0
Total sensor worth	7.95E-05	0.0
Notes: (I) Aperture half-angle (degree)	0.105	0.105
(II) Number of TV lines	1000.0	100.0
(III) Image motion compensation used	No	No
* Pointing stability = yaw rate limit		



APPENDIX A. SENSOR SUPPORT REQUIREMENTS TABLES

This appendix contains the one-page summary tables of sensor observation objectives, measurement capabilities, support requirements, and worth values. Observation objectives are indicated by citing pages in Reference A-1.* The content and preparation of the tables are described in Section 3.4. The sensors and planetary encounters represented by summary tables are indicated in Tables 3-1, 3-3, and 3-5. Cases not represented are outside the scope of the study or where the marginal measurement requirements are beyond the sensor state-of-the-art. The summary tables are arranged in the following order:

Sensor type, by number as given in Table 3-1.

Flyby mission number as in Table 3-3.

In multi-planet missions, in order of increasing distance from the sun.

Orbiter missions, by planets in order of increasing distance from the sun.

Orbit number as in Table 3-5.

In the compatible sensor family tables of Section 4, the support requirement summary tables are referred to by page number and by a two-part sheet number. The first part of the sheet number is the sensor type number assigned in Table 3-1. The second part is a sequence number in accord with the ordering scheme just described. The Michelson interferometer and filter radiometer summary tables are combined and assigned dual sheet numbers. The Michelson interferometer is the best design approach to the optimal infrared spectrometric measurement requirements, but the filter radiometer is the best approach to the marginal requirements.

The measurement capabilities and support requirements of particle and field sensors vary little, if at all, from one encounter to another. A summary table is provided for each such sensor for one encounter. The other applications of this sensor type, and any changes in the information in the summary table, are indicated in Tables A-1 through A-8. Each of these tables is inserted after the corresponding summary sheet.

*Reference A-1. Observation Requirements for Unmanned Planetary Missions, NR SD, SD 70-24 (11 March 1970).

Sensor Support Requirements Summary

Sheet Number 1-2

Sensor type TV CAMERA Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>125</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
	Page C - <u>127</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>128</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
	Page C - <u>130</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 2.80

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1.0	1.0
Characteristics	Max Alt	Max Alt
Time to periapsis (sec)	-2.59E04	-1.04E05
Latitude (deg)	80.0	81.9
Longitude (deg)	-180.0	-42.1
Sun angle (deg)	6.0	3.6
Support requirements		
Mass (kg)	189.0	2.61
Average power (w)	72.3	5.73
Length (m)	6.55	3.52
Width (m)	0.963	0.1
Height (m)	0.963	0.1
Volume (m ³)	5.7	0.04
Data rate (bit/sec)	1.49E08	700.0
Pointing accuracy (deg)	0.044	0.030
Pointing stability (deg/sec)*	0.272	0.129
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Pitch rate limit (deg/sec)	5.17E-03	1.69E-04
Capability parameters		
Maximum wavelength (λ_M) (μ)	0.7	(Same)
Minimum wavelength (λ_m) (μ)	0.4	(Same)
Spectral resolution ($\Delta\lambda$) (μ)	0.02	(Same)
Spatial resolution (m)	2000.0	1.5E06
Angular resolution (deg)	3.05E-04	3.0E-03
Exposure time (sec)	0.098	2.96
Field/view length (km)	1.43E06	7.48E07
Swath width (km)	1.43E06	7.48E07
Area/frame (%)	0.029	50.0
Total area (%)	56.0	50.0
Total sensor worth	6.10E-05	0.0
Notes: (I) Aperture half-angle (degree)	0.109	0.105
(II) Number of TV lines	1000.0	100.0
(III) Image motion compensation used	Yes	No

* Pointing stability \approx yaw rate limit

Sensor Support Requirements Summary

Sheet Number 1-3

Sensor type TV CAMERA Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24 Page C - <u>124</u>	Worth = <u>0.60</u>	Page C - <u>130</u>	Worth = <u>0.80</u>
Page C - <u>125</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
Page C - <u>126</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
Page C - <u>127</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
Page C - <u>128</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____

Total observation worth = 4.00

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1.0	1.0
Characteristics	Max Alt	Max Alt
Time to periapsis (sec)	-2.36E04	-5.21E04
Latitude (deg)	-29.9	-29.8
Longitude (deg)	47.3	-138.0
Sun angle (deg)	23.4	6.0
Support requirements		
Mass (kg)	188.2	2.61
Average power (w)	72.3	5.73
Length (m)	6.55	3.52
Width (m)	0.961	0.1
Height (m)	0.961	0.1
Volume (m ³)	5.68	0.04
Data rate (bit/sec)	2.9E08	700.0
Pointing accuracy (deg)	0.044	0.028
Pointing stability (deg/sec)*	0.090	0.050
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Pitch rate limit (deg/sec)	1.72E-03	6.0E-05
Capability parameters		
Maximum wavelength (λ_M) (μ)	0.7	(Same)
Minimum wavelength (λ_m) (μ)	0.4	(Same)
Spectral resolution ($\Delta\lambda$) (μ)	0.02	(Same)
Spatial resolution (m)	2000.0	1.5E06
Angular resolution (deg)	3.05E-04	3.0E-03
Exposure time (sec)	0.03	8.25
Field/view length (km)	1.43E06	6.98E07
Swath width (km)	1.43E06	6.98E07
Area/frame (%)	0.033	50.0
Total area (%)	24.5	50.0
Total sensor worth	2.54E-05	0.0
Notes: (I) Aperture half-angle (degree)	0.109	0.105
(II) Number of TV lines	1000.0	100.0
(III) Image motion compensation used	Yes	No

* Pointing stability = yaw rate limit

Sensor Support Requirements Summary

Sheet Number 1-4

Sensor type TV CAMERA Mission number 12 Planet SATURN

Observation objectives:

SD 70-24 Page C - <u>123</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
Page C - <u>126</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
Page C - <u>127</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
Page C - <u>128</u>	Worth = <u>0.60</u>	Page C - _____	Worth = _____
Page C - <u>130</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____

Total observation worth = 3.10

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1.0	1.0
Characteristics	Max Alt	Max Alt
Time to periapsis (sec)	-9.07E04	-3.31E05
Latitude (deg)	-4.5	-8.9
Longitude (deg)	100.0	-86.4
Sun angle (deg)	20.0	6.2
Support requirements		
Mass (kg)	193.7	2.61
Average power (w)	57.3	5.73
Length (m)	6.54	3.52
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	6.11	0.04
Data rate (bit/sec)	1.91E06	700.0
Pointing accuracy (deg)	0.042	0.019
Pointing stability (deg/sec)*	0.78	0.60
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Pitch rate limit (deg/sec)	1.43E-03	4.96E-04
Capability parameters		
Maximum wavelength (λ_M) (μ)	0.7	(Same)
Minimum wavelength (λ_m) (μ)	0.4	(Same)
Spectral resolution ($\Delta\lambda$) (μ)	0.02	(Same)
Spatial resolution (m)	9700.0	6.0E06
Angular resolution (deg)	3.0E-04	3.0E-03
Exposure time (sec)	0.033	1.0
Field/view length (km)	6.78E06	1.9E08
Swath width (km)	6.78E06	1.9E08
Area/frame (%)	0.10	50.0
Total area (%)	99.2	50.0
Total sensor worth	1.69E-04	0.0
Notes: (I) Aperture half-angle (degree)	0.105	0.105
(II) Number of TV lines	1000.0	100.0
(III) Image motion compensation used	No	No

* Pointing stability \approx yaw rate limit

Sensor Support Requirements Summary
Sheet Number 1-5

TELEVISION

Sensor type SYSTEM Orbit Number 1 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 152, 153

Capability level
Observation requirements level

Maximum
Optimal

Support requirements

Mass (kg)	86.3
Average power (w)	87.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.62
Data rate (bit/sec)	5.4×10^7
Pointing accuracy (deg)	0.0023
Roll rate limit (deg/sec)	0.19
Yaw rate limit (deg/sec)	1.6
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	5.0
Exposure time (sec)	0.005
Field of view (deg)	0.68×0.68
Swath width (km)	12.0
Area/frame (%)	1.97×10^{-4}

Sensor Support Requirements Summary Sheet Number 1-6

Sensor type TV SYSTEM Orbit Number 10 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
 volume 5, pages 140, 146

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	14.5
Average power (w)	32.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.018
Data rate (bit/sec)	1.1×10^6
Pointing accuracy (deg)	0.023
Roll rate limit (deg/sec)	0.33
Yaw rate limit (deg/sec)	3.3
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	200.0
Exposure time (sec)	0.01
Field of view (deg)	5.7×5.7
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 1-7

Sensor type TV SYSTEM Orbit Number 1 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 99, 113

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	10.9
Average power (w)	24.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.014
Data rate (bit/sec)	1.3×10^4
Pointing accuracy (deg)	6.3
Roll rate limit (deg/sec)	42.0
Yaw rate limit (deg/sec)	250.0
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	2.0×10^4
Exposure time (sec)	0.01
Field of view (deg)	112 x 112
Swath width (km)	-
Area/frame (%)	-



Sensor Support Requirements Summary
Sheet Number 1-8

Sensor type TV SYSTEM Orbit Number 9 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 108, 110

Capability level
Observation requirements level

Maximum
Optimal

Support requirements

Mass (kg)	14.5
Average power (w)	32.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.018
Data rate (bit/sec)	7.2×10^5
Pointing accuracy (deg)	0.27
Roll rate limit (deg/sec)	1.4
Yaw rate limit (deg/sec)	9.6
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	0.01
Field of view (deg)	98 x 98
Swath width (km)	-
Area/frame (°)	-

Sensor Support Requirements Summary
Sheet Number 1-9

Sensor type TV SYSTEM Orbit Number 1 (1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 50, 80

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	14.5
Average power (w)	32.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.018
Data rate (bit/sec)	3.8×10^5
Pointing accuracy (deg)	0.18
Roll rate limit (deg/sec)	0.39
Yaw rate limit (deg/sec)	1.2
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	0.01
Field of view (deg)	34 x 34
Swath width (km)	600.0
Area/frame (%)	0.2517



Sensor Support Requirements Summary
Sheet Number 1-10

Sensor type TV SYSTEM Orbit Number 8 (1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 66, 65

Capability level
Observation requirements level

Maximum
Optimal

Support requirements

Mass (kg)	163.4
Average power (w)	47.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	1.87
Data rate (bit/sec)	2.4×10^8
Pointing accuracy (deg)	0.0013
Roll rate limit (deg/sec)	0.18
Yaw rate limit (deg/sec)	8.4
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	5.0
Exposure time (sec)	0.003
Field of view (deg)	0.5×0.5
Swath width (km)	3.8
Area/frame (%)	1.5×10^{-5}

Sensor Support Requirements Summary
Sheet Number 1-11

Sensor type TV SYSTEM Orbit Number 1 (1978) Planet JUPITER

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 170, 171

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	127.1
Average power (w)	32.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	1.62
Data rate (bit/sec)	3.8×10^5
Pointing accuracy (deg)	0.0012
Roll rate limit (deg/sec)	0.06
Yaw rate limit (deg/sec)	25.0
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	0.001
Field of view (deg)	0.6 x 0.6
Swath width (km)	2300.0
Area/frame (%)	0.0083

Sensor Support Requirements Summary
Sheet Number 1-12

Sensor type TV SYSTEM Orbit Number 9 (1978) Planet JUPITER

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 167, 165

Capability level Observation requirements level	Maximum Optimal
Support requirements	
Mass (kg)	20.4
Average power (w)	32.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.034
Data rate (bit/sec)	3.8×10^5
Pointing accuracy (deg)	0.009
Roll rate limit (deg/sec)	0.29
Yaw rate limit (deg/sec)	19.0
Scan rate limit (deg/sec)	-
Capability parameters	
Spatial resolution (m)	2.0×10^4
Exposure time (sec)	0.001
Field of view (deg)	2.8×2.8
Swath width (km)	20,000.0
Area/frame (%)	0.630



Sensor Support Requirements Summary
Sheet Number 1-13

Sensor type TV SYSTEM Orbit Number 11 (1978) Planet JUPITER

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 174, 168

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	18.2
Average power (w)	32.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.027
Data rate (bit/sec)	3.8×10^5
Pointing accuracy (deg)	0.011
Roll rate limit (deg/sec)	0.03
Yaw rate limit (deg/sec)	2.1
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	2.0×10^4
Exposure time (sec)	0.01
Field of view (deg)	3.6×3.6
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 2-1

CAMERA

Sensor type SYSTEM Orbit Number 1(1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 158, 132

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	272.4
Average power (w)	110.0
Length (m)	0.88
Width (m)	0.40
Height (m)	0.73
Volume (m ³)	0.26
Data rate (bit/sec)	1.2x10 ⁸
Pointing accuracy (deg)	5.7x10 ⁻⁴
Roll rate limit (deg/sec)	0.38
Yaw rate limit (deg/sec)	1.2
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	5.0
Exposure time (sec)	5.0x10 ⁻⁴
Field of view (deg)	18x18
Swath width (km)	160.0
Area/frame (%)	0.035

Sensor Support Requirements Summary
Sheet Number 2-2

CAMERA

Sensor type SYSTEM Orbit Number 1(1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 53, 29

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	11.35
Average power (w)	36.0
Length (m)	0.30
Width (m)	0.18
Height (m)	0.30
Volume (m ³)	0.016
Data rate (bit/sec)	6.9x10 ⁵
Pointing accuracy (deg)	0.17
Roll rate limit (deg/sec)	0.89
Yaw rate limit (deg/sec)	0.77
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	0.01
Field of view (deg)	87x87
Swath width (km)	2300.0
Area/frame (°/°)	3.70

Sensor Support Requirements Summary
Sheet Number 2-3

SENSOR CAMERA
Sensor type SYSTEM Orbit Number 8(1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 49, 45

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	263.3
Average power (w)	280.0
Length (m)	1.5
Width (m)	0.3
Height (m)	1.2
Volume (m ³)	0.71
Data rate (bit/sec)	1.2x10 ⁹
Pointing accuracy (deg)	0.0024
Roll rate limit (deg/sec)	0.29
Yaw rate limit (deg/sec)	0.27
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	5.0
Exposure time (sec)	0.003
Field of view (deg)	8x8
Swath width (km)	105.0
Area/frame (°)	7.0x10 ⁻³

Sensor Support Requirements Summary

(MAPPING)

 Sheet Number 3-1

 Sensor type RADIOMETER Mission number 7 Planet SATURN
Observation objectives:

SD 70-24	Page C - <u>112</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>114</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>115</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - <u>116</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

 Total observation worth = 1.60

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Altitude
Time to periapsis (sec)	0.0	-159.1
Latitude (deg)	-12.38	0.39
Longitude (deg)	0.0	60.5
Sun angle (deg)	142.9	48.2
Support requirements		
Mass (kg)	116.6	1.1
Average power (w)	51.5	5.0
Length (m)	2.25	5.85 E-02
Width (m)	5.0	1.3 E-01
Height (m)	5.0	1.3 E-01
Volume (m ³)	56.4	7.78 E-04
Data rate (bit/sec)	121.9	0.029
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	1.42 E-03	3.33 E-03
Roll rate limit (deg/sec)	1.42 E-03	3.33 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	18.7	18.7
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	5.0 E 03
Minimum wavelength (λ_m) (μ)	100.0	5.0 E 03
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	3.74 E 06	1.0 E 08
Angular resolution (deg)	0.573	2.2
Exposure time (sec)	0.115	280.4
Field/view length (km)	3.74 E 03	1.0 E 05
Swath width (km)	3.74 E 03	1.0 E 05
Area/frame (%)	0.031	0.012
Total area (%)	56.6	25.7
Total sensor worth	6.70 E-11	0.0
Notes: Intensity resolution (%)	0.993	9.23
Temperature resolution (K)	1.79	16.6
Predetection bandwidth (Hz)	1.5 E 11	3.0 E 05

*Extrema of all requirements not necessarily incurred at point listed.

Sensor Support Requirements Summary

(MAPPING)

 Sheet Number 3-2

 Sensor type RADIOMETER Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>112</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>114</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>115</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>116</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

 Total observation worth = 1.60

 Capability level
 Observation requirements level

 Maximum
 Optimal

 Minimum
 Marginal

Trajectory points*

Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-1.47 E 03
Latitude (deg)	-17.19	2.62
Longitude (deg)	0.0	16.39
Sun angle (deg)	105.2	85.2

Support requirements

Mass (kg)	114.2	1.00
Average power (w)	50.9	5.0
Length (m)	2.25	0.012
Width (m)	5.0	0.026
Height (m)	5.0	0.026
Volume (m ³)	56.4	6.59 E-06
Data rate (bit/sec)	188.7	4.34 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	4.84 E-04	8.38 E-03
Roll rate limit (deg/sec)	4.84 E-04	8.38 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	17.0	17.0

Capability parameters

Maximum wavelength (λ_M) (μ)	1.0 E 05	5.0 E 03
Minimum wavelength (λ_m) (μ)	100.0	5.0 E 03
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	2.13 E 06	1.0 E 08
Angular resolution (deg)	0.573	10.8
Exposure time (sec)	0.074	1.84 E 03
Field/view length (km)	2.13 E 03	1.0 E 05
Swath width (km)	2.13 E 03	1.0 E 05
Area/frame (%)	0.064	1.23
Total area (%)	43.1	6.5

Total sensor worth

4.68 E-11

0.0

Notes: Intensity resolution (%)

1.03

10.12

Temperature resolution (K)

1.34

13.16

Predetection bandwidth (Hz)

1.5 E 11

273.0

*Extrema of all requirements not necessarily incurred at point listed.



Sensor Support Requirements Summary

(MAPPING)

Sheet Number 3-3

MICROWAVE

Sensor type RADIOMETER Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>112</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>114</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>115</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>116</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.60

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-5.67 E 03
Latitude (deg)	9.8	-21.3
Longitude (deg)	0.0	-38.1
Sun angle (deg)	128.4	63.4
Support requirements		
Mass (kg)	129.0	1.0
Average power (w)	54.47	5.0
Length (m)	2.25	0.012
Width (m)	5.0	0.026
Height (m)	5.0	0.026
Volume (m ³)	56.4	6.59 E-06
Data rate (bit/sec)	213.7	2.07 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	4.06 E-04	0.024
Roll rate limit (deg/sec)	4.06 E-04	0.024
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	27.1	27.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	5.0 E 03
Minimum wavelength (λ_m) (μ)	100.0	5.0 E 03
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	8.4 E 05	1.0 E 08
Angular resolution (deg)	0.573	10.81
Exposure time (sec)	0.066	3.87 E 03
Field/view length (km)	840.0	1.0 E 05
Swath width (km)	840.0	1.0 E 05
Area/frame (%)	0.012	0.286
Total area (%)	18.4	17.1
Total sensor worth	1.90 E-11	0.0
Notes: Intensity resolution (%)	0.962	9.27
Temperature resolution (K)	1.11	10.66
Predetection bandwidth (Hz)	1.5 E 11	4.54 E 04

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

(MAPPING)

MICROWAVE

 Sheet Number 3-4

 Sensor type RADIOMETER Mission number 12 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>112</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>114</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>115</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - <u>116</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

 Total observation worth = 1.60

 Capability level
 Observation requirements level

 Maximum
 Optimal

 Minimum
 Marginal

Trajectory points*

Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-6.18 E 04
Latitude (deg)	-53.48	-8.27
Longitude (deg)	0.0	160.1
Sun angle (deg)	104.0	26.1

Support requirements

Mass (kg)	543.2	3.46
Average power (w)	79.6	5.0
Length (m)	5.63	0.288
Width (m)	12.5	0.64
Height (m)	12.5	0.64
Volume (m ³)	88.2	0.093
Data rate (bit/sec)	80.6	0.046
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	2.91 E-04	4.44 E-04
Roll rate limit (deg/sec)	2.91 E-04	4.44 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	5.25	5.25

Capability parameters

Maximum wavelength (λ_M) (μ)	1.0 E 05	5.0 E 03
Minimum wavelength (λ_m) (μ)	100.0	5.0 E 03
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	8.0 E 06	1.0 E 08
Angular resolution (deg)	0.229	0.448
Exposure time (sec)	0.174	173.3
Field/view length (km)	8.0 E 03	1.0 E 05
Swath width (km)	8.0 E 03	1.0 E 05
Area/frame (%)	0.140	0.017
Total area (%)	75.0	75.0

Total sensor worth

9.66 E-11

0.0

Notes: Intensity resolution (%)

1.18

9.66

Temperature resolution (K)

2.13

17.38

Predetection bandwidth (Hz)

1.5 E 11

3.92 E 05

*Extrema of all requirements not necessarily incurred at point listed.

Sensor Support Requirements Summary
Sheet Number 3-5

PASSIVE MICROWAVE IMAGING

Sensor type SYSTEM Orbit Number 1 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 240

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	217.5
Average power (w)	100.0
Length (m)	6.4
Width (m)	-
Height (m)	-
Volume (m ³)	0.0033
Data rate (bit/sec)	2100.0
Pointing accuracy (deg)	1.1
Roll rate limit (deg/sec)	35.0
Yaw rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.23x60
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 3-6

PASSIVE MICROWAVE IMAGING

Sensor type SYSTEM Orbit Number 1 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 237, 236

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	16.80
Average power (w)	72.0
Length (m)	0.61
Width (m)	-
Height (m)	-
Volume (m ³)	0.0049
Data rate (bit/sec)	440.0
Pointing accuracy (deg)	0.76
Roll rate limit (deg/sec)	0.14
Yaw rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.38x6.3
Swath width (km)	-
Area/frame (°)	-

Sensor Support Requirements Summary
Sheet Number 3-7

PASSIVE MICROWAVE IMAGING

Sensor type SYSTEM Orbit Number 1 (1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 229

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	547.1
Average power (w)	110.0
Length (m)	10.1
Width (m)	-
Height (m)	-
Volume (m ³)	0.0033
Data rate (bit/sec)	1400.0
Pointing accuracy (deg)	0.59
Roll rate limit (deg/sec)	16.0
Yaw rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.15x34
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary

Sheet Number 4-1

Sensor type MEASURING RADIOMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>027</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 3.39

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-936.0
Latitude (deg)	-3.77	-29.2
Longitude (deg)	0.0	69.2
Sun angle (deg)	38.9	41.2
Support requirements		
Mass (kg)	1.92 E 03	3.34
Average power (w)	75.20	5.0
Length (m)	11.31	0.563
Width (m)	25.12	1.25
Height (m)	25.12	1.25
Volume (m ³)	7.14 E 03	0.69
Data rate (bit/sec)	49.5	0.054
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	6.15 E-04	0.163
Roll rate limit (deg/sec)	6.15 E-04	0.163
Scan rate limit (deg/sec)	6.15 E-04	0.163
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	2.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	9.75 E 04	1.0 E 05
Angular resolution (deg)	0.229	0.458
Exposure time (sec)	0.061	55.0
Field/view length (km)	97.5	100.0
Swath width (km)	97.5	100.0
Area/frame (%)	0.013	5.09 E-04
Total area (%)	0.48	0.48
Total sensor worth	7.22 E-06	0.0
Notes: Intensity resolution (%)	2.28	9.33
Temperature resolution (K)	13.7	56.0
Pre-detection bandwidth (Hz)	1.5 E 10	2.44 E 06

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 4-2

Sensor type MEASURING RADIOMETER Mission number 3 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>028</u>	Worth = <u>0.70</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>030</u>	Worth = <u>0.70</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = 5.60

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-4.26 E 04
Latitude (deg)	-19.58	24.4
Longitude (deg)	0.0	-103.3
Sun angle (deg)	84.4	30.7
Support requirements		
Mass (kg)	91.36	1.094
Average power (w)	45.2	5.0
Length (m)	2.27	0.113
Width (m)	5.05	0.25
Height (m)	5.05	0.25
Volume (m ³)	57.95	5.53 E-03
Data rate (bit/sec)	5.26	2.57 E-05
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	3.88 E-05	9.82 E-06
Roll rate limit (deg/sec)	3.88 E-05	9.82 E-06
Scan rate limit (deg/sec)	3.88 E-05	9.82 E-06
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	6.1 E 05	7.0 E 06
Angular resolution (deg)	0.573	2.29
Exposure time (sec)	0.57	1.17 E 05
Field/view length (km)	610.0	7.0 E 03
Swath width (km)	610.0	7.0 E 03
Area/frame (%)	0.298	10.48
Total area (%)	1.54	22.3
Total sensor worth	2.48 E-07	0.0
Notes: Intensity resolution (%)	6.94	10.09
Temperature resolution (K)	48.58	70.66
Pre-detection bandwidth (Hz)	1.5 E 10	0.25

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 4-3

Sensor type MEASURING RADIOMETER Mission number 6 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>028</u>	Worth = <u>0.70</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>030</u>	Worth = <u>0.70</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 5.60

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	1.84 E 03	3.58 E 04
Latitude (deg)	28.2	-8.23
Longitude (deg)	77.1	105.1
Sun angle (deg)	39.8	8.4
Support requirements		
Mass (kg)	507.7	3.34
Average power (w)	75.2	5.0
Length (m)	5.68	0.562
Width (m)	12.63	1.25
Height (m)	12.63	1.25
Volume (m ³)	905.5	0.691
Data rate (bit/sec)	4.03	8.57 E-06
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	2.29 E-06	6.55 E-07
Roll rate limit (deg/sec)	2.29 E-06	6.55 E-07
Scan rate limit (deg/sec)	2.29 E-06	6.55 E-07
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	1.0 E 06	7.0 E 06
Angular resolution (deg)	0.229	0.458
Exposure time (sec)	0.744	3.5 E 05
Field/view length (km)	1.0 E 03	7.0 E 03
Swath width (km)	1.0 E 03	7.0 E 03
Area/frame (%)	0.214	10.48
Total area (%)	0.31	21.0
Total sensor worth	1.69 E-05	0.0
Notes: Intensity resolution (%)	3.77	10.04
Temperature resolution (K)	26.41	70.29
Pre-detection bandwidth (Hz)	1.5 E 10	0.084

*Extrema of all requirements not necessarily incurred at points listed.



Sensor Support Requirements Summary

Sheet Number 4-4

MEASURING

Sensor type RADIOMETER Mission number 6 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>027</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 3.39

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-1.15 E 03
Latitude (deg)	-0.34	8.14
Longitude (deg)	0.0	69.8
Sun angle (deg)	2.1	68.0
Support requirements		
Mass (kg)	1.93 E 03	3.34
Average power (w)	75.20	5.0
Length (m)	11.31	0.562
Width (m)	25.10	1.25
Height (m)	25.10	1.25
Volume (m ³)	7.14 E 03	0.691
Data rate (bit/sec)	39.4	0.044
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	5.44 E-04	1.29 E-01
Roll rate limit (deg/sec)	5.44 E 04	1.29 E-01
Scan rate limit (deg/sec)	5.44 E-04	1.29 E-01
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	2.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	9.82 E 04	1.0 E 05
Angular resolution (deg)	0.229	0.458
Exposure time (sec)	0.076	67.57
Field/view length (km)	98.2	100.0
Swath width (km)	98.2	100.0
Area/frame (%)	0.013	5.14 E-04
Total area (%)	0.50	0.49
Total sensor worth	7.55 E-07	0.0
Notes: Intensity resolution (%)	2.039	9.91
Temperature resolution (K)	12.24	59.46
Pre-detection bandwidth (Hz)	1.5 E 10	1.93 E 06

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 4-5

Sensor type MEASURING RADIOMETER Mission number 7 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = 6.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-2.83 E 04
Latitude (deg)	-5.9	2.53
Longitude (deg)	0.0	157.4
Sun angle (deg)	109.0	21.2
Support requirements		
Mass (kg)	91.36	2.109
Average power (w)	45.20	5.0
Length (m)	2.27	0.387
Width (m)	5.05	0.860
Height (m)	5.05	0.860
Volume (m ³)	57.95	0.225
Data rate (bit/sec)	2.9	0.01
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	2.03 E-03	0.024
Roll rate limit (deg/sec)	2.03 E-03	0.024
Scan rate limit (deg/sec)	2.03 E-03	0.024
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	9.94 E 03
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	2.49 E 06	6.94 E 06
Angular resolution (deg)	0.573	0.666
Exposure time (sec)	1.034	292.9
Field/view length (km)	2.49 E 03	6.94 E 03
Swath width (km)	2.49 E 03	6.94 E 03
Area/frame (%)	9.69 E-03	3.73 E-04
Total area (%)	0.35	3.2
Total sensor worth	1.84 E-09	0.0
Notes: Intensity resolution (%)	0.941	9.37
Temperature resolution (K)	2.45	24.35
Pre-detection bandwidth (Hz)	1.5 E 10	3.75 E 08

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

MEASURING
 Sheet Number 4-6
 Sensor type RADIOMETER Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = 6.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-3.86 E 04
Latitude (deg)	-12.4	-4.57
Longitude (deg)	0.0	-97.05
Sun angle (deg)	142.9	28.3
Support requirements		
Mass (kg)	43.25	2.11
Average power (w)	34.5	5.0
Length (m)	2.27	0.387
Width (m)	5.05	0.860
Height (m)	5.05	0.860
Volume (m ³)	45.6	0.225
Data rate (bit/sec)	0.404	8.49 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	9.42 E-04	3.32 E-03
Roll rate limit (deg/sec)	9.42 E-04	3.32 E-03
Scan rate limit (deg/sec)	9.42 E-04	3.32 E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	3.97 E 06	6.94 E 06
Angular resolution (deg)	0.573	0.666
Exposure time (sec)	7.43	353.5
Field/view length (km)	3.97 E 03	6.94 E 03
Swath width (km)	3.97 E 03	6.94 E 03
Area/frame (%)	0.078	1.07 E-03
Total area (%)	4.2	4.9
Total sensor worth	1.49 E-08	0.0
Notes: Intensity resolution (%)	0.966	9.68
Temperature resolution (K)	1.74	17.42
Pre-detection bandwidth (Hz)	1.5 E 10	1.12 E 07

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 4-7

Sensor type MEASURING RADIOMETER Mission number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = 6.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-2.28 E 04
Latitude (deg)	-2.47	1.32
Longitude (deg)	0.0	142.0
Sun angle (deg)	112.0	22.5
Support requirements		
Mass (kg)	132.85	1.735
Average power (w)	49.80	5.0
Length (m)	2.80	0.315
Width (m)	6.21	0.70
Height (m)	6.21	0.70
Volume (m ³)	107.8	0.121
Data rate (bit/sec)	49.02	9.21 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	1.15 E-03	1.26 E-03
Roll rate limit (deg/sec)	1.15 E-03	1.26 E-03
Scan rate limit (deg/sec)	1.15 E-03	1.26 E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	2.13 E 06	7.0 E 06
Angular resolution (deg)	0.466	0.818
Exposure time (sec)	0.061	357.1
Field/view length (km)	2.13 E 03	7.0 E 03
Swath width (km)	2.13 E 03	7.0 E 03
Area/frame (%)	0.0248	0.0115
Total area (%)	1.5	3.2
Total sensor worth	7.79 E-09	0.0
Notes: Intensity resolution (%)	0.816	10.27
Temperature resolution (K)	2.12	26.69
Pre-detection bandwidth (Hz)	1.5 E 10	1.8 E 04

*Extrema of all requirements not necessarily incurred at points listed.



Sensor Support Requirements Summary

Sheet Number 4-8

MEASURING
Sensor type RADIOMETER Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 6.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-4.45 E 04
Latitude (deg)	-17.0	79.2
Longitude (deg)	0.0	100.9
Sun angle (deg)	105.0	5.2
Support requirements		
Mass (kg)	132.8	1.74
Average power (w)	49.8	5.0
Length (m)	2.8	0.315
Width (m)	6.2	0.7
Height (m)	6.2	0.7
Volume (m ³)	107.8	0.121
Data rate (bit/sec)	1.24	6.6 E-04
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	1.59 E-04	8.27 E-03
Roll rate limit (deg/sec)	1.59 E-04	8.27 E-03
Scan rate limit (deg/sec)	1.59 E-04	8.27 E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	3.13 E 06	7.0 E 06
Angular resolution (deg)	0.466	0.818
Exposure time (sec)	0.243	4.55 E 03
Field/view length (km)	3.13 E 03	7.0 E 03
Swath width (km)	3.13 E 03	7.0 E 03
Area/frame (%)	0.138	7.17 E-03
Total area (%)	4.2	12.2
Total sensor worth	1.29 E-06	0.0
Notes: Intensity resolution (%)	1.839	9.89
Temperature resolution (K)	2.391	12.85
Pre-detection bandwidth (Hz)	1.5 E 10	6.75 E 07

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

MEASURING Sheet Number 4-9

Sensor type RADIOMETER Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = _____

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-2.36 E 04
Latitude (deg)	9.08	-29.94
Longitude (deg)	0.0	47.31
Sun angle (deg)	128.4	23.40
Support requirements		
Mass (kg)	132.85	1.735
Average power (w)	49.80	5.0
Length (m)	2.80	0.315
Width (m)	6.21	0.70
Height (m)	6.21	0.70
Volume (m ³)	107.8	0.121
Data rate (bit/sec)	3.6	2.0 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	5.22 E-04	0.024
Roll rate limit (deg/sec)	5.22 E-04	0.024
Scan rate limit (deg/sec)	5.22 E-04	0.024
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.07 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	9.41 E 03
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	1.37 E 06	5.94 E 06
Angular resolution (deg)	0.466	0.818
Exposure time (sec)	0.834	1.49 E 03
Field/view length (km)	1.37 E 03	5.94 E 03
Swath width (km)	1.37 E 03	5.94 E 03
Area/frame (%)	0.03	1.64 E-03
Total area (%)	0.59	16.2
Total sensor worth	8.48 E-10	0.0
Notes: Intensity resolution (%)	3.38	9.127
Temperature resolution (K)	3.98	10.50
Pre-detection bandwidth (Hz)	1.5 E 10	3.75 E 09

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 4-10

MEASURING
 Sensor type RADIOMETER Mission number 12 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = 6.40

Capability level
 Observation requirements level

Maximum
 Optimal

Minimum
 Marginal

Trajectory points*

Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-3.46 E 04
Latitude (deg)	-6.35	-4.39
Longitude (deg)	0.0	-79.56
Sun angle (deg)	102.0	32.0

Support requirements

Mass (kg)	507.7	3.124
Average power (w)	75.2	5.0
Length (m)	5.68	0.535
Width (m)	12.62	1.19
Height (m)	12.62	1.19
Volume (m ³)	905.53	0.597
Data rate (bit/sec)	33.88	9.76 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	4.8 E-04	1.19 E-03
Roll rate limit (deg/sec)	4.8 E-04	1.19 E-03
Scan rate limit (deg/sec)	4.8 E-04	1.19 E-03
Scan amplitude (deg)	-	-

Capability parameters

Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	5.83 E 06	7.0 E 06
Angular resolution (deg)	0.229	0.481
Exposure time (sec)	0.0885	307.5
Field/view length (km)	5.83 E 03	7.0 E 03
Swath width (km)	5.83 E 03	7.0 E 03
Area/frame (%)	0.053	0.019
Total area (%)	9.0	4.9

Total sensor worth

4.29 E-09

0.0

Notes: Intensity resolution (%)

1.085

10.98

Temperature resolution (K)

2.82

28.54

Pre-detection bandwidth (Hz)

1.5 E 10

6.95 E 03

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 4-11

Sensor type MEASURING RADIOMETER Mission number 12 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

Total observation worth = 6.40

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points*		
Point	2	1
Characteristics	Periapsis	Max. Alt.
Time to periapsis (sec)	0.0	-6.18 E 04
Latitude (deg)	-53.48	-8.27
Longitude (deg)	0.0	160.1
Sun angle (deg)	104.0	26.10
Support requirements		
Mass (kg)	507.67	2.109
Average power (w)	75.2	5.0
Length (m)	5.68	0.387
Width (m)	12.6	0.860
Height (m)	12.6	0.860
Volume (m ³)	905.53	0.225
Data rate (bit/sec)	6.02	0.004
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	4.41 E-04	4.44 E-04
Roll rate limit (deg/sec)	4.41 E-04	4.44 E-04
Scan rate limit (deg/sec)	4.41 E-04	4.44 E-04
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	5.15 E 06	7.0 E 06
Angular resolution (deg)	0.229	0.666
Exposure time (sec)	0.50	756.0
Field/view length (km)	5.15 E 03	7.0 E 03
Swath width (km)	5.15 E 03	7.0 E 03
Area/frame (%)	0.058	0.038
Total area (%)	7.9	12.0
Total sensor worth	3.76 E-08	0.0
Notes: Intensity resolution (%)	1.07	7.61
Temperature resolution (K)	1.93	13.69
Pre-detection bandwidth (Hz)	1.5 E 10	1.44 E 05

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

 MEASURING
 MICROWAVE

 Sheet Number 4-12

 Sensor type RADIOMETER Orbit number 1 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>027</u>	Worth = <u>0.99</u>	Page C - _____	Worth = _____
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

 Total observation worth = 3.39

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	3.48 E 03
Latitude (deg)	-88.7	88.9
Longitude (deg)	243.0	62.7
Sun angle (deg)	90.9	89.3
Support requirements		
Mass (kg)	1.93 E+03	1.00
Average power (w)	75.2	5.0
Length (m)	11.3	0.0225
Width (m)	25.1	0.05
Height (m)	25.1	0.05
Volume (m ³)	7.14 E+03	4.42 E-05
Data rate (bit/sec)	122.1	0.112
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	0.257	0.257
Roll rate limit (deg/sec)	0.257	0.257
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	2.0 E+05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E+03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	2.0 E+03	1.0 E 05
Angular resolution (deg)	0.229	11.46
Exposure time (sec)	-	-
Field/view length (km)	2.0	1.0 E 02
Swath width (km)	2.0	1.0 E 02
Area/frame (%)	5.43 E-06	1.36 E-02
Total area (%)	0.032	1.15
Total sensor worth	0.0652	0.0
Notes: Intensity resolution (%)	0.11	5.0
Temperature resolution (K)	0.11	5.0
Pre-detection bandwidth (Hz)	1.5 E 10	1.34 E 04

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

 MEASURING
 MICROWAVE

 Sheet Number 4-13

 Sensor type RADIOMETER

 Orbit number 10

 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>027</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

 Total observation worth = 1.69

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	1.10 E+05
Latitude (deg)	-64.9	-7.1
Longitude (deg)	326.9	147.2
Sun angle (deg)	72.5	107.5
Support requirements		
Mass (kg)	1.93 E 03	1.01
Average power (w)	75.2	5.0
Length (m)	11.3	0.0405
Width (m)	25.1	0.09
Height (m)	25.1	0.09
Volume (m ³)	7.14 E 03	2.58 E-04
Data rate (bit/sec)	1.23	4.14 E-05
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	5.28 E-05	0.0366
Roll rate limit (deg/sec)	5.28 E-05	0.0366
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	2.0 E 05	1.03 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	9.76 E 03
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	2.17 E 05	1.09 E 07
Angular resolution (deg)	0.229	6.37
Exposure time (sec)	-	-
Field/view length (km)	2.17 E 02	1.09 E 04
Swath width (km)	2.17 E 02	1.09 E 04
Area/frame (%)	6.41 E-02	7.25 E-02
Total area (%)	2.49	32.4
Total sensor worth	8.85 E-04	0.0
Notes: Intensity resolution (%)	1.0	5.2
Temperature resolution (K)	1.0	5.2
Pre-detection bandwidth (Hz)	1.5 E 10	1.5 E 09

*Extrema of all requirements not necessarily at points listed



Sensor Support Requirements Summary

MEASURING
MICROWAVE

Sheet Number 4-14

Sensor type RADIOMETER Orbit number 1 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>028</u>	Worth = <u>0.70</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
	Page C - <u>030</u>	Worth = <u>0.70</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 5.60

Capability level
Observation requirements level

Maximum
Optimal

Minimum
Marginal

Trajectory points*

Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	3.0 E 03
Latitude (deg)	7.0	7.0
Longitude (deg)	104.0	104.0
Sun angle (deg)	132.8	132.8

Support requirements

Mass (kg)	50.8	1.00
Average power (w)	75.2	5.0
Length (m)	5.68	0.023
Width (m)	12.6	0.05
Height (m)	12.6	0.05
Volume (m ³)	905.0	4.42 E-05
Data rate (bit/sec)	924.0	0.288
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	0.824	0.824
Roll rate limit (deg/sec)	0.824	0.824
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-

Capability parameters

Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	1.82 E 03	9.1 E 04
Angular resolution (deg)	0.229	11.46
Exposure time (sec)	-	-
Field/view length (km)	1.82	91.0
Swath width (km)	1.82	91.0
Area/frame (%)	7.05 E-07	1.76 E-03
Total area (%)	0.0152	0.77

Total sensor worth

0.0187

0.0

Notes: Intensity resolution (%)

1.0

10.0

Temperature resolution (K)

2.0

20.0

Predetection bandwidth (Hz)

4.5 E 09

2.4 E 04

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

 MEASURING
 MICROWAVE

 Sheet Number 4-15

 Sensor type RADIOMETER Orbit number 9 Planet VENUS
Observation objectives:

SD 70-24	Page C - <u>028</u>	Worth = <u>0.70</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
	Page C - <u>030</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>055</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>

 Total observation worth = 5.60

 Capability level
 Observation requirements level

 Maximum
 Optimal

 Minimum
 Marginal

Trajectory points*

	2	1
Point	Min. Alt.	Max. Alt.
Characteristics		
Time to periapsis (sec)	3.18 E 03	900.0
Latitude (deg)	7.4	54.7
Longitude (deg)	103.5	284.0
Sun angle (deg)	132.2	66.7

Support requirements

Mass (kg)	507.7	1.00
Average power (w)	75.2	5.0
Length (m)	5.68	0.0333
Width (m)	12.6	0.074
Height (m)	12.6	0.074
Volume (m ³)	905.5	1.43 E-04
Data rate (bit/sec)	3.22	2.63 E-04
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	5.09 E-04	1.32 E-03
Roll rate limit (deg/sec)	5.09 E-04	1.32 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-

Capability parameters

Maximum wavelength (λ_M) (μ)	1.0 E 05	1.02 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	9.76 E 03
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	2.07 E 05	7.0 E 06
Angular resolution (deg)	0.229	7.74
Exposure time (sec)	-	-
Field/view length (km)	2.07 E 02	7.0 E 03
Swath width (km)	2.07 E 02	7.0 E 03
Area/frame (%)	9.18 E-03	0.0205
Total area (%)	0.95	33.9

Total sensor worth

	0.0118	0.0
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Notes: Intensity resolution (%)

	1.0	10.0
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Temperature resolution (K)

	2.0	20.0
--	-----	------

Pre-detection bandwidth (Hz)

	1.5 E 10	1.5 E 09
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*Extrema of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

MEASURING
MICROWAVE

Sheet Number 4-16

Sensor type RADIOMETER Orbit number 1 Planet MARS

Observation objectives:

SD 70-24 Page C - <u>027</u>	Worth = <u>0.99</u>	Page C - _____	Worth = _____
Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
Page C - <u>055</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____

Total observation worth = 4.19

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	4.41 E 03
Latitude (deg)	-83.6	83.0
Longitude (deg)	136.0	298.5
Sun angle (deg)	71.7	108.1
Support requirements		
Mass (kg)	507.7	1.00
Average power (w)	75.2	5.0
Length (m)	5.68	0.0225
Width (m)	12.6	0.05
Height (m)	12.6	0.05
Volume (m ³)	905.5	4.42 E-05
Data rate (bit/sec)	88.9	0.0603
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	0.138	0.138
Roll rate limit (deg/sec)	0.138	0.138
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	4.06 E 03	2.0 E 05
Angular resolution (deg)	0.229	11.5
Exposure time (sec)	-	-
Field/view length (km)	4.06	200.0
Swath width (km)	4.06	200.0
Area/frame (%)	1.15 E-05	0.0288
Total area (%)	0.062	3.35
Total sensor worth	0.0325	0.0
Notes: Intensity resolution (%)	0.067	3.37
Temperature resolution (K)	0.1	5.0
Predetection bandwidth (Hz)	1.33 E 10	7.84 E 03

*Extrema of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

MEASURING
MICROWAVE

Sheet Number 4-17

Sensor type RADIOMETER Orbit number 8 Planet MARS

Observation objectives:

SD 70-24	Page C - <u>027</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>055</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 4.19

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	1.74 E 03	1.48 E 04
Latitude (deg)	-51.1	21.9
Longitude (deg)	10.5	246.3
Sun angle (deg)	105.7	86.0
Support requirements		
Mass (kg)	507.7	1.02
Average power (w)	75.2	5.0
Length (m)	5.68	0.0567
Width (m)	12.6	0.126
Height (m)	12.6	0.126
Volume (m ³)	905.5	7.08 E-04
Data rate (bit/sec)	16.5	3.30 E-03
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	3.0 E-03	0.229
Roll rate limit (deg/sec)	3.0 E-03	0.229
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.03 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	9.76 E 03
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	5.03 E 04	1.0 E 06
Angular resolution (deg)	0.229	4.55
Exposure time (sec)	-	-
Field/view length (km)	50.3	1.0 E 03
Swath width (km)	50.3	1.0 E 03
Area/frame (%)	1.77 E-03	3.0 E-03
Total area (%)	0.526	10.8
Total sensor worth	7.67 E-03	0.0
Notes: Intensity resolution (%)	1.0	3.65
Temperature resolution (K)	1.5	5.5
Predetection bandwidth (Hz)	1.5 E 10	1.5 E 09

*Extrema of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

MEASURING
MICROWAVE

Sheet Number 4-18

Sensor type RADIOMETER Orbit number 1 Planet JUPITER

Observation objectives:

SD 70-24 Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.80</u>
Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.90</u>
Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 6.40

Capability level
Observation requirements level

Maximum
Optimal

Minimum
Marginal

Trajectory points*

Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	7.11 E 04
Latitude (deg)	-34.5	33.0
Longitude (deg)	7.51	22.2
Sun angle (deg)	128.8	50.6

Support requirements

Mass (kg)	507.7	1.71
Average power (w)	75.2	5.0
Length (m)	5.68	0.310
Width (m)	12.6	0.688
Height (m)	12.6	0.688
Volume (m ³)	905.5	0.115
Data rate (bit/sec)	3.49	8.79 E-04
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	1.83 E-04	2.39 E-03
Roll rate limit (deg/sec)	1.83 E-04	2.39 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-

Capability parameters

Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	1.93 E 06	6.0 E 06
Angular resolution (deg)	0.229	0.833
Exposure time (sec)	-	-
Field/view length (km)	1.93 E 03	7.0 E 03
Swath width (km)	1.93 E 03	7.0 E 03
Area/frame (%)	5.81 E-03	1.07 E-02
Total area (%)	0.84	3.1

Total sensor worth

6.24 E-05

0.0

Notes: Intensity resolution (%)

1.0

10.0

Temperature resolution (K)

1.0

10.0

Pre-detection bandwidth (Hz)

3.0 E 09

1.65 E 05

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

 MEASURING
 MICROWAVE

 Sheet Number 4-19

 Sensor type RADIOMETER Orbit number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.90</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.70</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

 Total observation worth = 6.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	1.12 E 05
Latitude (deg)	3.4	-3.5
Longitude (deg)	149.9	350.5
Sun angle (deg)	81.1	99.2
Support requirements		
Mass (kg)	507.7	6.53
Average power (w)	75.2	5.0
Length (m)	5.68	0.864
Width (m)	12.6	1.92
Height (m)	12.6	1.92
Volume (m ³)	905.5	2.50
Data rate (bit/sec)	0.899	1.48 E-04
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	2.49 E-05	2.7 E-03
Roll rate limit (deg/sec)	2.49 E-05	2.7 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	4.2 E 06	7.0 E 06
Angular resolution (deg)	0.229	0.298
Exposure time (sec)	-	-
Field/view length (km)	4.2 E 03	7.0 E 03
Swath width (km)	4.2 E 03	7.0 E 03
Area/frame (%)	2.60 E-02	1.34 E-03
Total area (%)	0.875	1.91
Total sensor worth	6.02 E-05	0.0
Notes: Intensity resolution (%)	1.0	10.0
Temperature resolution (K)	1.0	10.0
Pre-detection bandwidth (Hz)	1.5 E 10	3.3 E 07

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

 MEASURING
 MICROWAVE

 Sheet Number 4-20

 Sensor type RADIOMETER Orbit number 11 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>050</u>	Worth = <u>0.80</u>	Page C - <u>055</u>	Worth = <u>0.90</u>
	Page C - <u>051</u>	Worth = <u>0.80</u>	Page C - <u>056</u>	Worth = <u>0.70</u>
	Page C - <u>052</u>	Worth = <u>0.70</u>	Page C - <u>080</u>	Worth = <u>0.70</u>
	Page C - <u>053</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>054</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____

 Total observation worth = 6.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	2	1
Characteristics	Min. Alt.	Max. Alt.
Time to periapsis (sec)	0.0	1.24 E 05
Latitude (deg)	-41.6	39.8
Longitude (deg)	207.4	198.3
Sun angle (deg)	125.0	54.1
Support requirements		
Mass (kg)	507.7	2.36
Average power (w)	75.2	5.0
Length (m)	5.68	0.428
Width (m)	12.6	0.952
Height (m)	12.6	0.952
Volume (m ³)	905.5	0.305
Data rate (bit/sec)	3.19	6.24 E-04
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	9.39 E-05	5.12 E-04
Roll rate limit (deg/sec)	9.39 E-05	5.12 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0 E 05	1.0 E 04
Minimum wavelength (λ_m) (μ)	1.0 E 03	1.0 E 04
Spectral resolution ($\Delta\lambda$) (μ)	100.0	1.0 E 03
Spatial resolution (m)	2.66 E 06	7.0 E 06
Angular resolution (deg)	0.229	0.602
Exposure time (sec)	-	-
Field/view length (km)	2.66 E 03	7.0 E 03
Swath width (km)	2.66 E 03	7.0 E 03
Area/frame (%)	1.11 E-02	2.22 E-02
Total area (%)	1.38	3.64
Total sensor worth	6.23 E-05	0.0
Notes: Intensity resolution (%)	1.0	10.0
Temperature resolution (K)	1.0	10.0
Predetection bandwidth (Hz)	6.0 E 08	1.13 E 04

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

 SYNTHETIC
 APERTURE

 Sheet Number 5-1

 Sensor type RADAR Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>109</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - <u>110</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>113</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

 Total observation worth = 1.10

 Capability level
 Observation requirements level

 Maximum
 Optimal

 Minimum
 Marginal

Trajectory points

	1	2
Point	Max. Alt.	Min. Alt.
Characteristics		
Time to periapsis (sec)	-2.45 E 03	0.0
Latitude (deg)	-11.05	-12.4
Longitude (deg)	-6.59	0.0
Sun angle (deg)	113.0	142.9

Support requirements

Mass (kg)	1.82 E 04	97.14
Average power (w)	7.64 E 04	205.9
Length (m)	0.305	0.305
Width (m)	38.7	2.12
Height (m)	103.6	8.68
Volume (m ³) (10:1 Packing Ratio)	102.5	0.639
Data rate (bit/sec)	2.45 E 06	1.27 E-05
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	0.032	4.07 E 04
Roll rate limit (deg/sec)	1.69 E-03	4.57 E 03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Yaw/Pitch Rate Limits (deg/sec)	0.031/6.6 E-03	3.95 E 04/8383.0

Capability parameters

Maximum wavelength (λ_m) (m)	1.0	0.01
Minimum wavelength (λ_m) (m)	1.0 E-03	0.01
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)	100.0	1.0 E 07
Angular resolution (deg)	8.14 E-05	9.49
Exposure time (sec)	-	-
Field/view length (km)	3.41 E 03	163.2
Swath width (km)	1.0 E 03	100.0
Area/frame (%)	7.57 E-03	3.61x10 ⁻⁵
Total area (%)	0.138	0.014

Total sensor worth

	8.37 E-17	0.0
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Notes: Pulse compression ratio

	100.0	100.0
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Data bits/resolution element

	7.0	7.0
--	-----	-----

Uncompressed pulse width (sec)

	2.8 E-05	2.93
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Sensor Support Requirements Summary

SYNTHETIC
APERTURE

Sheet Number 5-2

Sensor type RADAR Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>109</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - <u>110</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>113</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 1.10

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-2.3 E 03	0.0
Latitude (deg)	12.52	-17.0
Longitude (deg)	25.42	0.0
Sun angle (deg)	75.20	105.0
Support requirements		
Mass (kg)	4.49 E 04	299.8
Average power (w)	5.81 E 03	34.1
Length (m)	0.305	0.305
Width (m)	105.5	9.53
Height (m)	96.34	7.57
Volume (m ³) (10:1 Packing Ratio)	301.8	2.29
Data rate (bit/sec)	5.05 E 06	4.45 E-05
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	0.034	5.05 E 04
Roll rate limit (deg/sec)	7.71 E-03	1.31 E 04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
	0.033/5.9 E-03	4.8 E 04/8148.0
Capability parameters		
Maximum wavelength (λ_m) (m)	1.0	0.01
Minimum wavelength (λ_m) (m)	1.0 E-03	0.01
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)	100.0	1.0 E 07
Angular resolution (deg)	9.9 E-05	11.56
Exposure time (sec)	-	-
Field/view length (km)	597.3	52.37
Swath width (km)	1.0 E 03	100.0
Area/frame (%)	8.42 E-03	7.44 E-05
Total area (%)	0.35	0.035
Total sensor worth	1.51 E-15	0.0
Notes:		
Pulse compression ratio	100.0	100.0
Data bits/resolution element	7.0	7.0
Uncompressed pulse width (sec)	8.1 E-05	3.74

Sensor Support Requirements Summary

SYNTHETIC
APERTURE

Sheet Number 5-3

Sensor type RADAR Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>109</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>110</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>113</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.10

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-1.08 E 03	0.0
Latitude (deg)	-5.77	9.08
Longitude (deg)	-19.23	0.0
Sun angle (deg)	98.40	126.6
Support requirements		
Mass (kg)	1.32 E 04	79.5
Average power (w)	6.67 E 03	27.2
Length (m)	0.305	0.305
Width (m)	86.68	7.5
Height (m)	37.79	3.07
Volume (m ³) (10:1 Packing Ratio)	86.46	0.811
Data rate (bit/sec)	6.56 E 06	5.14 E-05
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	0.128	1.84 E 05
Roll rate limit (deg/sec)	0.05	9.5 E 04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
	0.116/0.020	1.5 E 05/2.7 E 04
Capability parameters		
Maximum wavelength (λ_M) (m)	1.0	0.01
Minimum wavelength (λ_m) (m)	1.0 E-03	0.01
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)	100.0	1.0 E 07
Angular resolution (deg)	2.12 E-04	25.68
Exposure time (sec)	-	-
Field/view length (km)	372.24	26.5
Swath width (km)	1.0 E 03	1.0 E 02
Area/frame (%)	6.06 E-03	4.23 E-05
Total area (%)	0.375	0.375
Total sensor worth	3.56 E-16	0.0
Notes: Pulse compression ratio	100.0	100.0
Data bits/resolution element	7.0	7.0
Uncompressed pulse width (sec)	2.31 E-05	2.55



Sensor Support Requirements Summary

SYNTHETIC
APERTURE

Sheet Number 5-4

Sensor type RADAR Mission number 12 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>109</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>110</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>113</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.10

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-3.17 E 03	0.0
Latitude (deg)	52.39	-53.48
Longitude (deg)	14.3	0.0
Sun angle (deg)	94.1	104.0
Support requirements		
Mass (kg)	6.8 E 04	2.03 E 04
Average power (w)	5.75 E 05	6.26
Length (m)	0.305	0.305
Width (m)	72.61	62.4
Height (m)	95.36	72.5
Volume (m ³) (10:1 Packing Ratio)	211.19	138.0
Data rate (bit/sec)	2.2 E 06	1.93 E-04
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	5.3 E-03	548.6
Roll rate limit (deg/sec)	5.68 E-04	76.2
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Yaw/Pitch Rate Limits (deg/sec)	0.005/6.45 E-04	539.9/66.4
Capability parameters		
Maximum wavelength (λ_M) (m)	0.10	0.08
Minimum wavelength (λ_m) (m)	1.0 E-03	0.08
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)	100.0	1.0 E 07
Angular resolution (deg)	1.57 E-05	1.59
Exposure time (sec)	-	-
Field/view length (km)	615.46	430.3
Swath width (km)	1.0 E 03	1.0 E 03
Area/frame (%)	1.36 E-03	9.63 E-04
Total area (%)	0.046	0.046
Total sensor worth	2.39 E-17	0.0
Notes: Pulse compression ratio	100.0	100.0
Data bits/resolution element	7.0	7.0
Uncompressed pulse width (sec)	5.6 E-05	5.73



Sensor Support Requirements Summary
Sheet Number 5-5

SYNTHETIC APERTURE

Sensor type RADAR Orbit Number 1 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration
volume 5, pages 311, 303

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	290.6
Average power (w)	3300.6
Length (m)	4.8
Width (m)	10.1
Height (m)	-
Volume (m ³)	0.18
Data rate (bit/sec)	3.3x10 ⁷
Pointing accuracy (deg)	0.0011
Roll rate limit (deg/sec)	0.14
Yaw rate limit (deg/sec)	0.29
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	5.0
Exposure time (sec)	-
Field of view (deg)	1.4x0.72
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 5-6

SYNTHETIC APERTURE

Sensor type RADAR Orbit Number 1 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 289, 277

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	308.7
Average power (w)	5.4×10^6
Length (m)	0.34
Width (m)	100.7
Height (m)	-
Volume (m^3)	0.54
Data rate (bit/sec)	7.1×10^8
Pointing accuracy (deg)	0.0045
Roll rate limit (deg/sec)	0.0012
Yaw rate limit (deg/sec)	0.24
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	0.20
Exposure time (sec)	-
Field of view (deg)	21.0×0.072
Swath width (km)	-
Area/frame (%)	-



Sensor Support Requirements Summary
Sheet Number 6-1

NON-COHERENT

Sensor type RADAR SYSTEM Orbit Number 1 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 297, 295

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	87.2
Average power (w)	110.0
Length (m)	45.7
Width (m)	0.21
Height (m)	-
Volume (m ³)	0.16
Data rate (bit/sec)	3600.0
Pointing accuracy (deg)	0.81
Roll rate limit (deg/sec)	22.0
Yaw rate limit (deg/sec)	0.10
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.16x34.0
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 6-2

NON-COHERENT

Sensor type RADAR SYSTEM Orbit Number 1 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 280, 268

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	136.2
Average power (w)	540.0
Length (m)	67.1
Width (m)	0.20
Height (m)	-
Volume (m ³)	0.26
Data rate (bit/sec)	6.3×10^4
Pointing accuracy (deg)	0.17
Roll rate limit (deg/sec)	4000.0
Yaw rate limit (deg/sec)	140.0
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.12x35
Swath width (km)	-
Area/frame (°)	-

Sensor Support Requirements Summary
Sheet Number 6-3

NON-COHERENT

Sensor type RADAR SYSTEM Orbit Number 1 (1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 262, 248

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	172.5
Average power (w)	140.0
Length (m)	58.0
Width (m)	0.37
Height (m)	-
Volume (m ³)	0.258
Data rate (bit/sec)	2.2x10 ⁴
Pointing accuracy (deg)	11.0
Roll rate limit (deg/sec)	17.0
Yaw rate limit (deg/sec)	0.11
Scan rate limit (deg/sec)	-

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.086x14.0
Swath width (km)	-
Area/frame (%)	-



Sensor Support Requirements Summary

Sheet Number 7-1

Sensor type FLUX GATE
MAGNETOMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>72</u>	Worth = <u>0.72</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>108</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth =

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	2.1	Same
Average power (w)	6.0	"
Length (m)	0.15	"
Width (m)	0.10	"
Height (m)	0.10	"
Volume (m ³)	2.8 E-03	"
Data rate (bit/sec)	1500.0	1.5
Pointing accuracy (deg)	0.5	Same
Pointing stability (deg/sec)	0.05	0.5
Roll rate limit (deg/sec)	0.05	0.5
Scan rate limit (deg/sec)	0.05	0.5
Scan amplitude (deg)	-	-
Capability parameters		
Maximum field (gauss)	10.0	(Same)
Minimum field (gauss)	1.0 E-05	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	0.5	0.5
Exposure time (sec)	1.0	1000.0
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	-	-
Total sensor worth	1.22	

Notes: Point design, manual calculation

Sensor Support Requirements Summary

Sheet Number 8-1

Sensor type HELIUM MAGNETOMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>72</u>	Worth = <u>0.72</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>108</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.22

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points:		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	3.4	Same
Average power (w)	10.0	"
Length (m)	0.15	"
Width (m)	0.10	"
Height (m)	0.10	"
Volume (m ³)	2.8 E-03	"
Data rate (bit/sec)	40.0	"
Pointing accuracy (deg)	0.5	"
Pointing stability (deg/sec)	0.05	0.5
Roll rate limit (deg/sec)	0.05	0.5
Scan rate limit (deg/sec)	0.5	0.5
Scan amplitude (deg)	-	-
Capability parameters		
Maximum Field (gauss)	10.0	(Same)
Minimum Field (gauss)	1.0 E-05	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	0.5	0.5
Exposure time (sec)	1.0	1000.0
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	-	-
Total sensor worth	1.22	
Note: Point design, manual calculation		

Table A-1. Other Applications of Flux Gate Magnetometer/Helium Magnetometer

Changes in Data			
Mission No.	Planet	Item Changed	New Value
6	Mercury	None	--
Orbit 1	Mercury	None	--
Orbit 10	Mercury	None	--
7	Jupiter	Total observation worth Page C-108, Worth = 0.50 Total sensor worth	0.72 (delete) 1.22
12	Jupiter	Same as above	Same as above
Orbit 1	Jupiter	Same as above	Same as above
Orbit 9	Jupiter	Same as above	Same as above
Orbit 11	Jupiter	Same as above	Same as above
7	Saturn	Same as above	Same as above
12	Saturn	Same as above	Same as above
9	Uranus	Same as above	Same as above
9	Neptune	Same as above	Same as above

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SD 70-375-2

Sensor Support Requirements Summary

Sheet Number 9-1

Sensor type SCINTILLATION SPECTROMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>41</u>	Worth = <u>0.69</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.69

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	0.9	Same
Average power (w)	2.0	"
Length (m)	0.10	"
Width (m)	0.12	"
Height (m)	0.12	"
Volume (m ³)	1.2 E-03	"
Data rate (bit/sec)	100.0	"
Pointing accuracy (deg)	5.0	"
Pointing stability (deg/sec)	1.0	"
Roll rate limit (deg/sec)	1.0	"
Scan rate limit (deg/sec)	1.0	"
Scan amplitude (deg)	60.0	"
Capability parameters		
Maximum Energy (MeV)	3.0	(Same)
Minimum Energy (MeV)	0.3	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	-	-
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	100.0	100.0
Total sensor worth	0.69	0.69
Notes: Point design, manual calculation		

Table A-2. Other Applications of Scintillation Spectrometer

Changes in Data

Mission Number	Planet	Item Changed	New Value
6	Mercury	Scan amplitude	58.0
Orbit 1	Mercury	Scan amplitude	112.0
Orbit 10	Mercury	Scan amplitude	112.0
Orbit 1	Mars	Scan amplitude	98.0
Orbit 8	Mars	Scan amplitude	127.0

Sensor Support Requirements Summary

Sheet Number 11-1

Sensor type FARADAY CUP Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>44</u>	Worth = <u>0.15</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.15

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	8.7	1.5
Average power (w)	8.7	1.5
Length (m)	0.10*	0.10**
Width (m)	0.16*	0.16**
Height (m)	0.16*	0.16**
Volume (m ³)	7.8 E-03	1.3 E-03
Data rate (bit/sec)	420.0	70.0
Pointing accuracy (deg)	5.0	5.0
Pointing stability (deg/sec)	1.0	1.0
Roll rate limit (deg/sec)	1.0	1.0
Scan rate limit (deg/sec)	1.0	1.0
Scan amplitude (deg)	-	-
Capability parameters		
Maximum Energy (eV)	1000.0	(Same)
Minimum Energy (eV)	100.0	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	-	-
Exposure time (sec)	0.01	1.0
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	-	-
Total sensor worth	0.15	
Notes: * Each of 2 units ** Each of 6 units		

Table A-3. Other Applications of Faraday Cup

Changes in Data

Mission Number	Planet	Item Changed	New Value
6	Mercury	None	--
Orbit 1	Mercury	None	--
Orbit 10	Mercury	None	--

Sensor Support Requirements Summary

Sheet Number 12-1

Sensor type G-M COUNTER ARRAY Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>42</u>	Worth = <u>0.79</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.79

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	1.0	Same
Average power (w)	0.40	"
Length (m)	0.080	"
Width (m)	0.16	"
Height (m)	0.30	"
Volume (m ³)	3.8 E-03	"
Data rate (bit/sec)	30.0	"
Pointing accuracy (deg)	10.0	"
Pointing stability (deg/sec)	2.0	"
Roll rate limit (deg/sec)	2.0	"
Scan rate limit (deg/sec)	2.0	"
Scan amplitude (deg)	-	"
Capability parameters		
Maximum Energy (MeV)	30.0	(Same)
Minimum Energy (MeV)	5.0	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	-	-
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	-	-
Total sensor worth	0.79	0.79
Notes: Point design, manual calculation		

Table A-4. Other Applications of G-M Counter Array

Changes in Data

Mission Number	Planet	Item Changed	New Value
6	Mercury	None	--
Orbit 1	Mercury	None	--
Orbit 10	Mercury	None	--

Sensor Support Requirements Summary

Sheet Number 13-1

Sensor type PROPORTIONAL COUNTER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>40</u>	Worth = <u>0.49</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.49

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	5.0	Same
Average power (w)	1.0	"
Length (m)	0.06	"
Width (m)	0.20	"
Height (m)	0.10	"
Volume (m ³)	1.20 E-03	"
Data rate (bit/sec)	50.0	"
Pointing accuracy (deg)	5.0	"
Pointing stability (deg/sec)	1.0	"
Roll rate limit (deg/sec)	1.0	"
Scan rate limit (deg/sec)	1.0	"
Scan amplitude (deg)	60.0	"
Capability parameters		
Maximum wavelength (λ_M) (A)	20.0	(Same)
Minimum wavelength (λ_m) (A)	2.0	(Same)
Spectral resolution ($\Delta\lambda$)	1.0	(Same)
Spatial resolution (m)	1.0 E+04	1.0 E+06
Angular resolution (deg)	-	-
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	50.0	50.0
Total sensor worth	0.31	0.31

Notes: Point design, manual calculation

Table A-5. Other Applications of Proportional Counter

Changes in Data

Mission Number	Planet	Item Changed	New Value
6	Mercury	Trajectory points	All but SO*
6	Mercury	Scan amplitude	58.0
Orbit 1	Mercury	Trajectory points	All but SO
Orbit 1	Mercury	Scan amplitude	112.0
Orbit 10	Mercury	Trajectory points	All but SO
Orbit 10	Mercury	Scan amplitude	112.0
*SO = Sun occultation			

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SD 70-375-2

Sensor Support Requirements Summary

 Sheet Number 15-1

 Sensor type FILTER RADIOMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>36</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

 Total observation worth = 0.99

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-1.84 E+03	-935.0
Latitude (deg)	-30.0	-29.2
Longitude (deg)	80.8	69.2
Sun angle (deg)	49.9	41.2
Support requirements		
Mass (kg)	4.96	2.00
Average power (w)	66.5	25.5
Length (m)	0.0127	0.01
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	1.35 E-03	1.09 E-03
Data rate (bit/sec)	3.40	1.80 E-02
Pointing accuracy (deg)	1.00	1.00
Pointing stability (deg/sec)	4.61 E-04	0.115
Yaw rate limit (deg/sec)	3.26 E-04	0.0816
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	1.0	1.0
Collecting Optics Diameter (m)	0.01	0.01
Capability parameters		
Maximum wavelength (λ_M) (μ)	10.0	5.0
Minimum wavelength (λ_m) (μ)	1.0	4.0
Spectral resolution ($\Delta\lambda$) (μ)	0.5	2.0
Spatial resolution (m)	4.0 E 05	1.96 E+05
Angular resolution (deg)	1.0	1.0
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	0.169	1.90 E-03
Total area (%)	2.0	0.9
Total sensor worth	9.85 E-02	0.0
Notes:		
Aperture ratio	1.27	1.0
Number of detectors	3.0	1.0
Sensor spectral resolution capab. (cm ⁻¹)	50.0	800.0

*Extremum of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

Sheet Number 15-2

Sensor type FILTER RADIOMETER Mission number 3 Planet VENUS

Observation objectives:

SD 70-24 Page C - <u>62</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>69</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.60

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-1.4 E 03	-1.4 E 03
Latitude (deg)	1.6	1.6
Longitude (deg)	-46.1	-46.1
Sun angle (deg)	38.0	38.0
Support requirements		
Mass (kg)	6.58	4.99
Average power (w)	87.0	66.5
Length (m)	0.0363	0.01
Width (m)	0.0242	0.01
Height (m)	0.0242	0.01
Volume (m ³)	1.50 E-03	1.35 E-03
Data rate (bit/sec)	26.3	0.189
Pointing accuracy (deg)	0.402	5.74
Pointing stability (deg/sec)	0.0106	0.0307
Pitch/Yaw Rate Limit (deg/sec)	7.53 E-03	0.0217
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	35.0	34.3
Collecting Optics Diameter (m)	0.024	0.01
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.5	0.5
Spectral resolution ($\Delta\lambda$) (μ)	0.12	0.5
Spatial resolution (m)	1.34 E 05	1.84 E 06
Angular resolution (deg)	0.402	5.72
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	8.25 E-04	0.0626
Total area (%)	11.3	11.1
Total sensor worth	1.64 E-09	0.0
Notes:		
Aperture ratio	1.5	1.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab.(cm ⁻¹)	3.0	50.0

*Extremum of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-3

Sensor type FILTER RADIOMETER Mission number 6 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>36</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.99

Capability level
Observation requirements level

Maximum
Optimal

Minimum
Marginal

Trajectory points:*

Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-252.0	-252.0
Latitude (deg)	4.1	4.1
Longitude (deg)	29.7	29.7
Sun angle (deg)	28.0	28.0

Support requirements

Mass (kg)	6.68	4.99
Average power (w)	87.0	66.5
Length (m)	0.0634	0.01
Width (m)	0.0317	0.01
Height (m)	0.0317	0.01
Volume (m ³)	1.53 E-03	1.35 E-03
Data rate (bit/sec)	42.6	0.316
Pointing accuracy (deg)	0.230	5.74
Pointing stability (deg/sec)	0.0534	0.0534
Pitch/Yaw Rate Limit (deg/sec)	0.0377	0.0377
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	6.21	11.4
Collecting Optics Diameter (m)	0.032	0.01

Capability parameters

Maximum wavelength (λ_M) (μ)	10.0	10.0
Minimum wavelength (λ_m) (μ)	0.5	0.5
Spectral resolution ($\Delta\lambda$) (μ)	0.03	0.5
Spatial resolution (m)	1.28 E 04	3.27 E 05
Angular resolution (deg)	0.115	2.86
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.70 E-04	6.25 E-02
Total area (%)	1.0	1.9

Total sensor worth

9.85 E-02

0.0

Notes:

Aperture ratio	2.0	1.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	3.0	50.0

*Extremum of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-4

Sensor type FILTER RADIOMETER Mission number 6 Planet VENUS

Observation objectives:

SD 70-24 Page C - <u>62</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>69</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.60

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-1.26 E 03	-1.26 E 03
Latitude (deg)	20.4	20.4
Longitude (deg)	84.0	84.0
Sun angle (deg)	30.0	30.0
Support requirements		
Mass (kg)	6.68	4.99
Average power (w)	87.0	66.5
Length (m)	0.0634	0.01
Width (m)	0.0317	0.01
Height (m)	0.0317	0.01
Volume (m ³)	1.53 E-03	1.35 E-03
Data rate (bit/sec)	97.3	0.112
Pointing accuracy (deg)	0.230	5.74
Pointing stability (deg/sec)	9.90 E-03	0.209
Pitch/Yaw Rate Limit (deg/sec)	6.69 E-03	0.148
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	6.21	22.9
Collecting Optics Diameter (m)	0.032	0.01
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.5	0.5
Spectral resolution ($\Delta\lambda$) (μ)	0.12	0.5
Spatial resolution (m)	4.24 E 04	1.3 E+06
Angular resolution (deg)	0.230	5.72
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	2.92 E-04	6.49 E-03
Total area (%)	3.2	11.8
Total sensor worth	1.91 E-12	0.0
Notes:		
Aperture ratio	2.0	1.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	3.0	50.0

*Extremum of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-5 (19-1)
 (I) MICHELSON INTERFEROMETER

Sensor type (II) FILTER RADIOMETER Mission number 7 Planet JUPITER

Observation objectives:

SD 70-24 Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.00

Capability level Observation requirements level	Maximum Optimal (I)	Minimum (II) Marginal
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-1.18 E 04	-1.18 E 04
Latitude (deg)	0.5	0.5
Longitude (deg)	9.7	9.7
Sun angle (deg)	1.6	1.6
Support requirements		
Mass (kg)	1.26 E 03	5.07
Average power (w)	87.0	66.5
Length (m)	0.984	0.0689
Width (m)	0.984	0.0230
Height (m)	0.984	0.0230
Volume (m ³)	0.0295	1.38 E-03
Data rate (bit/sec)	7.66 E 03	1.22
Pointing accuracy (deg)	0.424	0.636
Pointing stability (deg/sec)	1.37 E-03	0.0168
Pitch/Yaw Rate Limit (deg/sec)	9.65 E-04	0.0119
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	18.2	17.2
Collecting Optics Diameter (m)	0.98	0.023
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.0354	0.5
Spatial resolution (m)	3.8 E+06	5.15 E+06
Angular resolution (deg)	0.424	0.636
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	5.53 E-04	2.65 E-04
Total area (%)	14.6	13.8
Total sensor worth	1.46 E-06	0.0
Notes:		
Aperture ratio	1.0	3.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	0.885	50.0

*Extremum of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-6 (19-2)

(I) MICHELSON INTERFEROMETER

Sensor type (II) FILTER RADIOMETER Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.00

Capability level	Maximum		Minimum
Observation requirements level	Optimal (I)	(II)	Marginal
Trajectory points:*			
Point	1		1
Characteristics	Max. Alt.		Max. Alt.
Time to periapsis (sec)	-1.59 E 04		-1.60 E 04
Latitude (deg)	0.4		0.4
Longitude (deg)	60.5		60.5
Sun angle (deg)	48.2		48.2
Support requirements			
Mass (kg)	1.26 E 03		3.03
Average power (w)	87.0		66.5
Length (m)	0.984		0.0689
Width (m)	0.984		0.0230
Height (m)	0.984		0.0230
Volume (m ³)	0.908		1.14 E-03
Data rate (bit/sec)	1.07 E 03		0.0856
Pointing accuracy (deg)	0.424		0.636
Pointing stability (deg/sec)	1.31 E-03		2.34 E-03
Pitch/Yaw Rate Limit (deg/sec)	9.28 E-04		1.66 E-03
Scan rate limit (deg/sec)	-		-
Scan amplitude (deg)	18.2		17.2
Collecting Optics Diameter (m)	0.98		0.023
Capability parameters			
Maximum wavelength (λ_M) (μ)	20.0		10.0
Minimum wavelength (λ_m) (μ)	0.75		0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.0354		0.5
Spatial resolution (m)	3.87 E 06		6.78 E 06
Angular resolution (deg)	0.424		0.636
Exposure time (sec)	-		-
Field/view length (km)	-		-
Swath width (km)	-		-
Area/frame (%)	6.34 E-03		7.68 E-04
Total area (%)	17.5		21.6
Total sensor worth	9.35 E-07		0.0
Notes:			
Aperture ratio	1.0		3.0
Number of detectors	4.0		3.0
Sensor spectral resolution capab. (cm ⁻¹)	0.885		50.0

*Extremum of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-7 (19-3)

(I) MICHELSON INTERFEROMETER

Sensor type (II) FILTER RADIOMETER Mission number 9 Planet JUPITER

Observation objectives:

SD 70-24 Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.00

Capability level Observation requirements level	Maximum Optimal (I)	Minimum (II) Marginal
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-1.35 E 04	-1.35 E 04
Latitude (deg)	67.3	67.3
Longitude (deg)	137.7	137.7
Sun angle (deg)	52.3	52.3
Support requirements		
Mass (kg)	2.13 E 03	4.99
Average power (w)	87.0	66.5
Length (m)	0.515	0.04
Width (m)	1.03	0.01
Height (m)	1.03	0.01
Volume (m ³)	0.614	1.35 E-03
Data rate (bit/sec)	2.21 E 03	0.050
Pointing accuracy (deg)	0.173	0.518
Pointing stability (deg/sec)	8.10 E-04	1.10 E-03
Pitch/Yaw Rate Limit (deg/sec)	5.73 E-04	7.75 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	9.49	9.84
Collecting Optics Diameter (m)	1.0	0.01
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.025	0.5
Spatial resolution (m)	1.15 E 06	3.5 E 06
Angular resolution (deg)	0.173	0.518
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.22 E-03	3.60 E-03
Total area (%)	11.3	11.6
Total sensor worth	1.21 E-06	0.0
Notes:		
Aperture ratio	0.5	4.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	0.625	50.0

*Extremum of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 15-8 (19-4)

Sensor type (I) MICHELSON INTERFEROMETER (II) FILTER RADIOMETER Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.00

Capability level Observation requirements level	Maximum Optimal (I)	Minimum (II) Marginal
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-2.08 E 04	-2.08 E 04
Latitude (deg)	72.0	72.0
Longitude (deg)	-140.6	-140.6
Sun angle (deg)	15.0	15.0
Support requirements		
Mass (kg)	2.13 E 03	2.95
Average power (w)	87.0	66.5
Length (m)	0.516	0.04
Width (m)	1.03	0.01
Height (m)	1.03	0.01
Volume (m ³)	0.614	1.35 E-03
Data rate (bit/sec)	3.65 E 03	2.23 E-03
Pointing accuracy (deg)	0.173	0.518
Pointing stability (deg/sec)	5.85 E-03	5.85 E-03
Pitch/Yaw Rate Limit (deg/sec)	4.14 E-03	4.14 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	2.93	2.07
Collecting Optics Diameter (m)	1.0	0.01
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.025	0.5
Spatial resolution (m)	1.16 E-06	3.11 E 06
Angular resolution (deg)	0.173	0.518
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.10 E-02	2.25 E-03
Total area (%)	18.2	12.9
Total sensor worth	1.48 E-05	0.0
Notes:		
Aperture ratio	0.5	4.0
Number of detectors	4.0	3.0
Sensors spectral resolution capab. (cm ⁻¹)	0.625	50.0

*Extremum of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 15-9 (19-5)

Sensor type (I) MICHELSON INTERFEROMETER (II) FILTER RADIOMETER Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.20

Capability level	Maximum Optimal (I)	Minimum (II) Marginal
Observation requirements level		
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-2.3 E 04	-2.3 E 04
Latitude (deg)	-29.8	-29.8
Longitude (deg)	40.0	40.0
Sun angle (deg)	25.0	25.0
Support requirements		
Mass (kg)	2.13 E 03	2.95
Average power (w)	87.0	66.5
Length (m)	0.516	0.04
Width (m)	1.03	0.01
Height (m)	1.03	0.01
Volume (m ³)	0.614	1.35 E-03
Data rate (bit/sec)	4.37 E 03	4.69 E-03
Pointing accuracy (deg)	0.173	0.518
Pointing stability (deg/sec)	1.70 E-02	2.39 E-04
Pitch/Yaw Rate Limit (deg/sec)	1.20 E-02	1.69 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	1.21	1.55
Collecting Optics Diameter (m)	1.0	0.01
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.025	0.5
Spatial resolution (m)	1.0 E+06	3.34 E 06
Angular resolution (deg)	0.173	0.518
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.26 E-02	5.16 E-04
Total area (%)	5.7	7.1
Total sensor worth	7.65 E-04	0.0
Notes:		
Aperture ratio	0.5	4.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	0.625	50.0

*Extremum of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 15-10 (19-6)

Sensor type (I) MICHELSON INTERFEROMETER
(II) FILTER RADIOMETER Mission number 12 Planet JUPITER

Observation objectives:

SD 70-24 Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.00

Capability level Observation requirements level	Maximum Optimal (I)	Minimum (II) Marginal
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-3.45 E 05	-3.5 E 05
Latitude (deg)	-4.4	-4.4
Longitude (deg)	-79.6	-79.6
Sun angle (deg)	32.0	32.0
Support requirements		
Mass (kg)	1.32 E 03	5.05
Average power (w)	87.0	66.5
Length (m)	1.00	0.012
Width (m)	1.00	0.020
Height (m)	1.00	0.020
Volume (m ³)	0.96	1.39 E-03
Data rate (bit/sec)	1.66 E 03	0.0546
Pointing accuracy (deg)	0.137	0.198
Pointing stability (deg/sec)	5.54 E-04	8.45 E-04
Pitch/Yaw Rate Limit (deg/sec)	3.91 E-04	5.97 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	2.33	2.38
Collecting Optics Diameter (m)	1.0	0.02
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.01	0.5
Spatial resolution (m)	2.29 E 06	3.13 E 06
Angular resolution (deg)	0.137	0.198
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	4.9 E-03	2.57 E-03
Total area (%)	28.2	32.0
Total sensor worth	1.17 E-07	0.0
Notes:		
Aperture ratio	1.0	6.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	0.25	50.0

*Extremum of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 15-11 (19-7)

Sensor type (I) MICHELSON INTERFEROMETER
(II) FILTER RADIOMETER Mission number 12 Planet SATURN

Observation objectives:

SD 70-24 Page C - <u>63</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>68</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>89</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.00

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points:*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-3.96 E 04	-3.96 E 04
Latitude (deg)	-16.2	-16.2
Longitude (deg)	-51.7	-51.7
Sun angle (deg)	35.5	35.5
Support requirements		
Mass (kg)	1.32 E 03	3.00
Average power (w)	87.0	66.5
Length (m)	1.00	0.122
Width (m)	1.00	0.0203
Height (m)	1.00	0.0203
Volume (m ³)	0.96	1.39 E-03
Data rate (bit/sec)	866.0	0.0320
Pointing accuracy (deg)	0.137	0.198
Pointing stability (deg/sec)	3.12 E-04	4.40 E-04
Pitch/Yaw Rate Limit (deg/sec)	2.20 E-04	3.12 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	2.33	2.38
Collecting Optics Diameter (m)	1.0	0.020
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.01	0.5
Spatial resolution (m)	2.44 E 06	3.18 E 06
Angular resolution (deg)	0.137	0.198
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	7.43 E-03	2.63 E-03
Total area (%)	35.4	36.1
Total sensor worth	1.33 E-07	0.0
Notes:		
Aperture ratio	1.0	6.0
Number of detectors	4.0	3.0
Sensor spectral resolution capab. (cm ⁻¹)	0.25	50.0

*Extremum of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 15-12

Sensor type FILTER RADIOMETER Orbit number 1 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>036</u>	Worth = <u>0.99</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.99

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	3.48 E 03	0.0
Latitude (deg)	88.9	-88.7
Longitude (deg)	62.7	243.0
Sun angle (deg)	89.3	90.9
Support requirements		
Mass (kg)	4.82	1.95
Average power (w)	66.5	25.5
Length (m)	0.01	0.01
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	1.35 E-03	1.09 E-03
Data rate (bit/sec)	1.00	0.191
Pointing accuracy (deg)	5.38	5.38
Pointing stability (deg/sec)	0.181	0.181
Pitch/yaw rate limit (deg/sec)	0.128	0.128
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	5.38	5.38
Capability parameters		
Maximum wavelength (λ_M) (μ)	10.0	5.0
Minimum wavelength (λ_m) (μ)	1.0	4.0
Spectral resolution ($\Delta\lambda$) (μ)	0.5	2.0
Spatial resolution (m)	4.71 E 04	4.71 E 04
Angular resolution (deg)	5.38	5.38
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	2.35 E-03	2.35 E-03
Total area (%)	1.0	1.0
Total sensor worth	0.0155	0.0
Notes: Aperture ratio	1.0	1.0
Number of detectors	3.0	1.0
Sensor spectral resolution capab. (cm ⁻¹)	50.0	800.0

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-13

Sensor type FILTER RADIOMETER Orbit number 10 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>036</u>	Worth = <u>0.99</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.99

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	1.10 E 05	0.0
Latitude (deg)	-7.1	7.0
Longitude (deg)	319.5	147.3
Sun angle (deg)	54.6	133.3
Support requirements		
Mass (kg)	4.82	1.94
Average power (w)	66.5	25.5
Length (m)	0.144	0.143
Width (m)	0.0128	0.01
Height (m)	0.0128	0.01
Volume (m ³)	1.36 E-03	0.01
Data rate (bit/sec)	84.5	2.40 E-03
Pointing accuracy (deg)	0.088	0.088
Pointing stability (deg/sec)	3.73 E-05	0.249
Pitch/yaw rate limit (deg/sec)	2.64 E-05	0.177
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	0.088	0.088
Capability parameters		
Maximum wavelength (λ_M) (μ)	10.0	5.0
Minimum wavelength (λ_m) (μ)	1.0	4.0
Spectral resolution ($\Delta\lambda$) (μ)	0.5	2.0
Spatial resolution (m)	8.34 E 04	8.34 E 04
Angular resolution (deg)	0.088	0.088
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	7.42 E-03	7.42 E-03
Total area (%)	1.0	1.0
Total sensor worth	0.099	0.0
Notes: Aperture ratio	11.2	1.0
Number of detectors	3.0	1.0
Sensor spectral resolution capab. (cm ⁻¹)	50.0	800.0

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-14

Sensor type FILTER RADIOMETER Orbit number 1 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - _____	Worth = _____
	Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - <u>069</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 2.60

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	3.0 E 03	0.0
Latitude (deg)	7.0	-8.0
Longitude (deg)	104.0	284.0
Sun angle (deg)	132.8	47.3
Support requirements		
Mass (kg)	4.84	4.82
Average power (w)	66.5	66.5
Length (m)	0.0144	0.01
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	1.35 E-03	1.35 E-03
Data rate (bit/sec)	138.6	0.090
Pointing accuracy (deg)	0.874	417.7
Pointing stability (deg/sec)	0.582	0.582
Pitch/yaw rate limit (deg/sec)	0.412	0.412
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	6.12	135.0
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.5	0.5
Spectral resolution ($\Delta\lambda$) (μ)	0.12	0.5
Spatial resolution (m)	6.95 E 03	3.44 E 06
Angular resolution (deg)	0.874	135.0
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	5.96 E-06	1.83
Total area (%)	0.41	10.0
Total sensor worth	1.65 E-06	0.0
Notes: Aperture ratio	1.42	1.0
Number of detectors	3	3
Sensor spectral resolution		
capab. (cm ⁻¹)	3.0	50.0

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 15-15

Sensor type FILTER RADIOMETER Orbit number 9 Planet VENUS

Observation objectives:

SD 70-24 Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>069</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.60

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	3.18 E 04	0.0
Latitude (deg)	7.4	-80.0
Longitude (deg)	103.5	284.0
Sun angle (deg)	132.2	47.3
Support requirements		
Mass (kg)	6.04	4.84
Average power (w)	66.5	66.5
Length (m)	0.11	8.0 E-03
Width (m)	0.063	0.01
Height (m)	0.063	0.01
Volume (m ³)	1.69 E-03	1.35 E-03
Data rate (bit/sec)	754.0	3.67 E-03
Pointing accuracy (deg)	0.115	3.37
Pointing stability (deg/sec)	3.60 E-04	0.0360
Pitch/yaw rate limit (deg/sec)	2.54 E-04	0.0254
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	2.29	6.64
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.5	0.5
Spectral resolution ($\Delta\lambda$) (μ)	0.12	0.5
Spatial resolution (m)	1.06 E 05	3.66 E 06
Angular resolution (deg)	0.115	3.32
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.80 E-03	3.57 E-05
Total area (%)	10.0	14.5
Total sensor worth	1.80 E-06	0.0
Notes: Aperture ratio	1.75	0.8
Number of detectors	3	3
Sensor spectral resolution capab. (cm ⁻¹)	3.0	50.0

*Extrema of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

Sheet Number 15-16

Sensor type FILTER RADIOMETER Orbit number 1 Planet MARS

Observation objectives:

SD 70-24	Page C - <u>036</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 3.09

Capability level	Maximum Optimal	Minimum Marginal
Observation requirements level		
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	4.41 E 03	0.0
Latitude (deg)	83.0	-83.6
Longitude (deg)	298.5	136.0
Sun angle (deg)	108.1	71.7
Support requirements		
Mass (kg)	4.84	4.82
Average power (w)	66.5	66.5
Length (m)	0.01	0.01
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	1.35 E-03	1.35 E-03
Data rate (bit/sec)	3.59	0.0224
Pointing accuracy (deg)	5.66	98.3
Pointing stability (deg/sec)	0.0965	0.0965
Pitch/yaw rate limit (deg/sec)	0.0690	0.0690
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	39.62	74.8
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.12	0.5
Spatial resolution (m)	1.21 E 05	3.02 E 06
Angular resolution (deg)	5.66	74.8
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	5.52 E-03	1.65
Total area (%)	10.6	10.0
Total sensor worth	3.56 E-06	0.0
Notes: Aperture ratio	1.0	1.0
Number of detectors	3	3
Sensor spectral resolution capab. (cm ⁻¹)	3.0	50.0

*Extrema of all requirements not necessarily at points listed

Sensor Support Requirements Summary

Sheet Number 15-17

Sensor type FILTER RADIOMETER Orbit number 8 Planet MARS

Observation objectives:

SD 70-24	Page C - <u>036</u>	Worth = <u>0.99</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 3.09

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	1.48 E 04	0.0
Latitude (deg)	21.9	-22.3
Longitude (deg)	246.3	125.7
Sun angle (deg)	86.0	94.1
Support requirements		
Mass (kg)	4.84	4.82
Average power (w)	66.5	66.5
Length (m)	0.0278	0.01
Width (m)	0.0120	0.01
Height (m)	0.0120	0.01
Volume (m ³)	1.35 E-03	1.35 E-03
Data rate (bit/sec)	28.6	2.65 E-03
Pointing accuracy (deg)	0.456	14.2
Pointing stability (deg/sec)	2.12 E-03	0.438
Pitch/yaw rate limit (deg/sec)	1.50 E-03	0.310
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	4.56	13.3
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	0.12	0.5
Spatial resolution (m)	1.02 E 05	3.62 E 06
Angular resolution (deg)	0.456	13.3
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	5.50 E-03	4.44 E-03
Total area (%)	10.8	31.5
Total sensor worth	1.81 E-06	0.0
Notes: Aperture ratio	2.3	1.0
Number of detectors	3	3
Sensor spectral resolution capab. (cm ⁻¹)	3.0	50.0

*Extrema of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

(I) MICHELSON INTERFEROMETER Sheet Number 15-18 (19-8)

Sensor type (II) FILTER RADIOMETER Orbit number 1 Planet JUPITER

Observation objectives:

SD 70-24 Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - <u>091</u>	Worth = <u>0.40</u>
Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>083</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>089</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 4.10

Capability level Observation requirements level	Maximum Optimal (I)	Minimum (II) Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	7.11 E 04	0.0
Latitude (deg)	33.0	-34.5
Longitude (deg)	22.2	207.4
Sun angle (deg)	50.6	128.8
Support requirements		
Mass (kg)	1.96 E 03	5.04
Average power (w)	66.5	66.5
Length (m)	0.498	0.0353
Width (m)	0.996	0.0307
Height (m)	0.996	0.0307
Volume (m ³)	0.553	1.38 E-03
Data rate (bit/sec)	4.36 E 03	0.0491
Pointing accuracy (deg)	0.115	0.358
Pointing stability (deg/sec)	1.29 E-04	1.70 E-03
Pitch/yaw rate limit (deg/sec)	9.15 E-05	1.20 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	1.15	2.86
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	4.0 E-03	0.5
Spatial resolution (m)	9.72 E 05	3.08 E 06
Angular resolution (deg)	0.115	0.358
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.15 E-03	1.55 E-03
Total area (%)	2.06	10.7
Total sensor worth	1.01 E-07	0.0
Notes: Aperture ratio	0.5	1.15
Number of detectors	3	3
Sensor spectral resolution capab. (cm ⁻¹)	0.1	50.0

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

(I) MICHELSON INTERFEROMETER Sheet Number 15-19 (19-9)

Sensor type (II) FILTER RADIOMETER Orbit number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - <u>091</u>	Worth = <u>0.40</u>
	Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>083</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>089</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 4.10

Capability level Observation requirements level	Maximum Optimal (I)	(II) Minimum Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	1.12×10^5	0.0
Latitude (deg)	-3.5	3.4
Longitude (deg)	350.2	149.9
Sun angle (deg)	99.2	81.1
Support requirements		
Mass (kg)	2.07 E 03	24.0
Average power (w)	66.5	66.5
Length (m)	0.509	0.01
Width (m)	1.02	0.167
Height (m)	1.02	0.167
Volume (m ³)	0.592	3.55 E-03
Data rate (bit/sec)	4.45 E 03	0.0137
Pointing accuracy (deg)	0.0381	0.126
Pointing stability (deg/sec)	7.76 E-06	1.91 E-03
Pitch/yaw rate limit (deg/sec)	5.52 E-06	1.35 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	0.1146	1.638
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	4.0 E-03	0.5
Spatial resolution (m)	9.0 E 05	3.1 E 06
Angular resolution (deg)	0.0382	0.126
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	9.92 E-04	1.88 E-04
Total area (%)	1.5	10.8
Total sensor worth	1.01 E-07	0.0
Notes: Aperture ratio	0.5	0.5
Number of detectors	3.	3.
Sensor spectral resolution capab. (cm ⁻¹)	0.1	50.0

*Extrema of all requirements not necessarily incurred at points listed



Sensor Support Requirements Summary

(I) MICHELSON
INTERFEROMETER Sheet Number 15-20 (19-10)

Sensor type (II) FILTER RADIOMETER Orbit number 11 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>062</u>	Worth = <u>0.80</u>	Page C - <u>091</u>	Worth = <u>0.40</u>
	Page C - <u>063</u>	Worth = <u>0.80</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>068</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>083</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>089</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 4.10

Capability level Observation requirements level	Maximum Optimal (I)	(II) Minimum Marginal
Trajectory points*		
Point	1	2
Characteristics	Apoapsis	Periapsis
Time to periapsis (sec)	1.24 E 05	0.0
Latitude (deg)	39.8	-41.6
Longitude (deg)	198.3	207.4
Sun angle (deg)	54.1	125.0
Support requirements		
Mass (kg)	1.99 E 03	4.99
Average power (w)	66.5	66.5
Length (m)	0.501	0.0486
Width (m)	1.00	0.0278
Height (m)	1.00	0.0278
Volume (m ³)	0.565	1.38 E-03
Data rate (bit/sec)	1.39 E 03	0.0303
Pointing accuracy (deg)	0.0776	0.260
Pointing stability (deg/sec)	6.64 E-05	3.62 E-04
Pitch/yaw rate limit (deg/sec)	4.70 E-05	2.56 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	0.776	1.82
Capability parameters		
Maximum wavelength (λ_M) (μ)	20.0	10.0
Minimum wavelength (λ_m) (μ)	0.75	0.75
Spectral resolution ($\Delta\lambda$) (μ)	4.0 E-03	0.5
Spatial resolution (m)	9.03 E 05	3.06 E 06
Angular resolution (deg)	0.0776	0.260
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	9.95 E-04	3.26 E-03
Total area (%)	4.72	10.9
Total sensor worth	1.01 E-07	0.0
Notes: Aperture ratio	0.5	1.75
Number of detectors	3.	3.
Sensor spectral resolution capab. (cm ⁻¹)	0.1	50.0

*Extrema of all requirements not necessarily incurred at points listed

Sensor Support Requirements Summary

Sheet Number 16-1

Sensor type FAR IR RADIOMETER Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>120</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>121</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points:*		
Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-1.58 E-04	0.0
Latitude (deg)	0.39	-12.4
Longitude (deg)	60.5	0.0
Sun angle (deg)	48.2	142.9
Support requirements		
Mass (kg)	33.96	3.14
Average power (w)	10.0	6.0
Length (m)	0.167	0.927
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	5.22 E-05	2.92 E-04
Data rate (bit/sec)	6.0	0.118
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	3.12 E-03	2.35 E-03
Yaw Rate Limit (deg/sec)	2.2 E-03	1.66 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	0.22	0.22
Pitch Rate Limit (deg/sec)	2.2 E-03	1.66 E-03
Capability parameters		
Maximum wavelength (λ_M) (μ)	5.0	1.5
Minimum wavelength (λ_m) (μ)	0.1	0.25
Spectral resolution ($\Delta\lambda$) (μ)	0.1	1.0
Spatial resolution (m)	4.2 E 05	1.0 E 06
Angular resolution (deg)	0.092	0.22
Exposure time (sec)	-	-
Field/view length (km)	1.0 E 03	231.8
Swath width (km)	1.0 E 03	231.8
Area/frame (%)	2.18 E-03	1.17 E 04
Total area (%)	0.21	0.21
Total sensor worth	2.26 E-09	0.0
Notes:		
Temperature resolution (K)	0.998	3.73
Detector average detectivity (m-Hz ^{1/2} /watt)	8.0 E 08	3.0 E 09

*Extrema of all requirements not necessarily incurred at points listed.



Sensor Support Requirements Summary

Sheet Number 16-2

Sensor type FAR IR RADIOMETER Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>120</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>121</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.40

Capability level
Observation requirements level

Maximum
Optimal

Minimum
Marginal

Trajectory points:*

Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-1.95 E 04	0.0
Latitude (deg)	70.98	-17.0
Longitude (deg)	-152.7	0.0
Sun angle (deg)	15.2	105.0

Support requirements

Mass (kg)	33.96	3.14
Average power (w)	10.0	6.0
Length (m)	0.166	0.347
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	5.22 x 10 ⁻⁵	1.09 x 10 ⁻⁴
Data rate (bit/sec)	6.07	0.02
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	2.80 E-04	5.85 E-03
Yaw Rate Limit (deg/sec)	1.98 E-04	4.14 E-03
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	0.169	0.211
Pitch Rate Limit (deg/sec)	1.98 E-04	4.14 E-03

Capability parameters

Maximum wavelength (λ_M) (μ)	5.0	1.5
Minimum wavelength (λ_m) (μ)	0.1	0.25
Spectral resolution ($\Delta\lambda$) (μ)	0.1	1.0
Spatial resolution (m)	6.02 E 05	1.0 E 06
Angular resolution (deg)	0.127	0.211
Exposure time (sec)	-	-
Field/view length (km)	804.7	1.0 E 03
Swath width (km)	804.7	1.0 E 03
Area/frame (%)	9.1 E-03	4.76 E-04
Total area (%)	0.77	0.96

Total sensor worth

1.92 E-07 0.0

Notes:

Temperature resolution (K)	1.00	2.93
Detector average detectivity (m-Hz ^{1/2} /watt)	8.0 E+08	3.0 E+09

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 16-3

Sensor type FAR IR RADIOMETER Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24 Page C - <u>120</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>121</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.40

Capability level
 Observation requirements level

Maximum
 Optimal

Minimum
 Marginal

Trajectory points:*

Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-1.48 E 04	0.0
Latitude (deg)	-29.65	9.08
Longitude (deg)	-2.85	0.0
Sun angle (deg)	28.4	128.4

Support requirements

Mass (kg)	33.96	3.14
Average power (w)	10.0	6.0
Length (m)	0.166	0.347
Width (m)	0.01	0.01
Height (m)	0.01	0.01
Volume (m ³)	5.22 x 10 ⁻⁵	1.09 x 10 ⁻⁴
Data rate (bit/sec)	17.65	0.029
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	4.1 E-04	0.017
Yaw Rate Limit (deg/sec)	2.9 E-04	0.012
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	0.169	0.211
Pitch Rate Limit (deg/sec)	2.9 E-04	0.012

Capability parameters

Maximum wavelength (λ_M) (μ)	5.0	1.5
Minimum wavelength (λ_m) (μ)	0.1	0.25
Spectral resolution ($\Delta\lambda$) (μ)	0.1	1.0
Spatial resolution (m)	5.24 E 05	8.0 E 05
Angular resolution (deg)	0.127	0.211
Exposure time (sec)	-	-
Field/view length (km)	698.5	82.2
Swath width (km)	698.5	82.2
Area/frame (%)	7.88 E-03	1.09 E-04
Total area (%)	0.39	0.049

Total sensor worth

3.15 E-08

0.0

Notes:

Temperature resolution (K)	1.71	5.00
Detector average detectivity (m-Hz ^{1/2} /watt)	8.0 E 08	3.0 E 09

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary

Sheet Number 16-4

Sensor type FAR IR RADIOMETER Mission number 12 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>120</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - <u>121</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 1.40

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points:*		
Point	1	2
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	-1.23 E 05	0.0
Latitude (deg)	-0.25	-53.5
Longitude (deg)	29.9	0.0
Sun angle (deg)	17.4	104.0
Support requirements		
Mass (kg)	34.71	3.14
Average power (w)	10.0	6.0
Length (m)	0.883	1.23
Width (m)	0.053	0.01
Height (m)	0.053	0.01
Volume (m ³)	7.72 x 10 ⁻³	3.86 x 10 ⁻⁴
Data rate (bit/sec)	6.06	0.071
Pointing accuracy (deg)	-	-
Pointing stability (deg/sec)	1.77 E-04	5.35 E-04
Yaw Rate Limit (deg/sec)	1.26 E-04	3.78 E-04
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	5.73 E-03	0.087
Pitch Rate Limit (deg/sec)	1.26 E-04	3.78 E-04
Capability parameters		
Maximum wavelength (λ_M) (μ)	5.0	1.5
Minimum wavelength (λ_m) (μ)	0.1	0.25
Spectral resolution ($\Delta\lambda$) (μ)	0.1	1.0
Spatial resolution (m)	1.73 E 05	1.0 E 06
Angular resolution (deg)	5.4 E-03	0.087
Exposure time (sec)	-	-
Field/view length (km)	247.0	1000.0
Swath width (km)	247.0	1000.0
Area/frame (%)	1.34 E-04	6.47 E-04
Total area (%)	0.36	0.48
Total sensor worth	9.00 E-09	0.0
Notes:		
Temperature resolution (K)	1.00	5.03
Detector average detectivity (m-Hz ^{1/2} /watt)	8.0 E 08	3.0 E 09

*Extrema of all requirements not necessarily incurred at points listed.

Sensor Support Requirements Summary
Sheet Number 16-5

IR SCANNING

Sensor type SYSTEM Orbit Number 1 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration
volume 5, pages 216, 215

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	34.96
Average power (w)	4.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.28
Data rate (bit/sec)	1.1×10^6
Pointing accuracy (deg)	0.23
Roll rate limit (deg/sec)	2000.0
Yaw rate limit (deg/sec)	2000.0
Scan rate limit (deg/sec)	4260.0

Capability parameters

Spatial resolution (m)	200.0
Exposure time (sec)	-
Field of view (deg)	0.023×11
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 16-6

IR SCANNING

Sensor type SYSTEM Orbit Number 10 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 219

Capability level Observation requirements level	Maximum Optimal
Support requirements	
Mass (kg)	5.0
Average power (w)	7.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0014
Data rate (bit/sec)	1.2×10^4
Pointing accuracy (deg)	0.37
Roll rate limit (deg/sec)	5.0
Yaw rate limit (deg/sec)	5.0
Scan rate limit (deg/sec)	10.2
Capability parameters	
Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.10×60.0
Swath width (km)	-
Area/frame (%)	-



Sensor Support Requirements Summary
Sheet Number 16-7

IR SCANNING

Sensor type SYSTEM Orbit Number 1 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 206, 200

Capability level Observation requirements level	Maximum Optimal
Support requirements	
Mass (kg)	3.18
Average power (w)	3.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0017
Data rate (bit/sec)	1.4×10^4
Pointing accuracy (deg)	1.3
Roll rate limit (deg/sec)	73.0
Yaw rate limit (deg/sec)	73.0
Scan rate limit (deg/sec)	144.0
Capability parameters	
Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.25×66
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary Sheet Number 16-8

IR SCANNING

Sensor type SYSTEM Orbit Number 9 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
 volume 5, pages 214, 208

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	1.68
Average power (w)	2.10
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0011
Data rate (bit/sec)	8200.0
Pointing accuracy (deg)	1.3
Roll rate limit (deg/sec)	180.0
Yaw rate limit (deg/sec)	180.0
Scan rate limit (deg/sec)	174.0

Capability parameters

Spatial resolution (m)	2.0×10^4
Exposure time (sec)	-
Field of view (deg)	0.52×98
Swath width (km)	-
Area/frame (%)	-



Sensor Support Requirements Summary
Sheet Number 16-9

IR SCANNING

Sensor type SYSTEM Orbit Number 1 (1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 187, 191

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	2.6
Average power (w)	1.5
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0057
Data rate (bit/sec)	3250.0
Pointing accuracy (deg)	0.59
Roll rate limit (deg/sec)	42.0
Yaw rate limit (deg/sec)	42.0
Scan rate limit (deg/sec)	84.0

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.16 x 34
Swath width (km)	-
Area/frame (°)	-

Sensor Support Requirements Summary
Sheet Number 16-10

IR SCANNING

Sensor type SYSTEM Orbit Number 9 (1978) Planet JUPITER

Data summarized from Orbital Imagery for Planetary Explorations,
volume 5, pages 226

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	726.4
Average power (w)	28.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	2.16
Data rate (bit/sec)	1.2×10^6
Pointing accuracy (deg)	0.015
Roll rate limit (deg/sec)	5.8
Yaw rate limit (deg/sec)	5.8
Scan rate limit (deg/sec)	11.4

Capability parameters

Spatial resolution (m)	2.0×10^4
Exposure time (sec)	-
Field of view (deg)	0.003×1.6
Swath width (km)	5000.0
Area/frame (°/0)	0.039



Sensor Support Requirements Summary
Sheet Number 18-1

UV SCANNING

Sensor type SYSTEM Orbit Number 1 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 20, 18

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	23.15
Average power (w)	1.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.077
Data rate (bit/sec)	1.3×10^6
Pointing accuracy (deg)	0.22
Roll rate limit (deg/sec)	2100.0
Yaw rate limit (deg/sec)	2100.0
Scan rate limit (deg/sec)	4200.0

Capability parameters

Spatial resolution (m)	200.0
Exposure time (sec)	-
Field of view (deg)	0.02×11
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 18-2

UV SCANNING

Sensor type SYSTEM Orbit Number 10 (1984) Planet MERCURY

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 19

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	1.04
Average power (w)	1.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0017
Data rate (bit/sec)	1.7×10^5
Pointing accuracy (deg)	0.5
Roll rate limit (deg/sec)	1900.0
Yaw rate limit (deg/sec)	1900.0
Scan rate limit (deg/sec)	3720.0

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.13×60.0
Swath width (km)	-
Area/frame (%)	-

Sensor Support Requirements Summary
Sheet Number 18-3

UV SCANNING

Sensor type SYSTEM Orbit Number 1 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 16, 14

Capability level Observation requirements level	Maximum Optimal
Support requirements	
Mass (kg)	1.0
Average power (w)	1.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0011
Data rate (bit/sec)	3.0×10^4
Pointing accuracy (deg)	1.3
Roll rate limit (deg/sec)	570.0
Yaw rate limit (deg/sec)	570.0
Scan rate limit (deg/sec)	1200.0
Capability parameters	
Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.24×67
Swath width (km)	-
Area/frame (%)	-



Sensor Support Requirements Summary
Sheet Number 18-4

UV SCANNING

Sensor type SYSTEM Orbit Number 9 (1977) Planet VENUS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 17

Capability level	Maximum
Observation requirements level	Optimal

Support requirements

Mass (kg)	1.36
Average power (w)	1.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0017
Data rate (bit/sec)	7.6×10^5
Pointing accuracy (deg)	0.27
Roll rate limit (deg/sec)	4800.0
Yaw rate limit (deg/sec)	4800.0
Scan rate limit (deg/sec)	9600.0

Capability parameters

Spatial resolution (m)	3000.0
Exposure time (sec)	-
Field of view (deg)	0.08×96
Swath width (km)	-
Area/frame (°)	-



Sensor Support Requirements Summary
Sheet Number 18-5

UV SCANNING

Sensor type SYSTEM Orbit Number 1 (1984) Planet MARS

Data summarized from Orbital Imagery for Planetary Exploration,
volume 5, pages 11, 13

Capability level Observation requirements level	Maximum Optimal
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Support requirements

Mass (kg)	1.0
Average power (w)	1.0
Length (m)	-
Width (m)	-
Height (m)	-
Volume (m ³)	0.0011
Data rate (bit/sec)	430.0
Pointing accuracy (deg)	3.1
Roll rate limit (deg/sec)	32.0
Yaw rate limit (deg/sec)	32.0
Scan rate limit (deg/sec)	60.0

Capability parameters

Spatial resolution (m)	2.0×10^4
Exposure time (sec)	-
Field of view (deg)	0.87×54
Swath width (km)	-
Area/frame (°/°)	-



Sensor Support Requirements Summary

VISIBLE/UV

Sheet Number 21-1

Sensor type SPECTROMETER Mission number 7 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points*		
Point	1	1
Characteristics	Max. Alt.	Max. Alt
Time to periapsis (sec)	-3.8 E 04	-5.4 E 04
Latitude (deg)	3.0	3.5
Longitude (deg)	-107.4	51.2
Sun angle (deg)	21.2	31.2
Support requirements		
Mass (kg)	888.7	2.08
Average power (w)	4.2	4.2
Length (m)	4.41	0.21
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	4.05	1.67 E-03
Data rate (bit/sec)	1.19 E 05	0.494
Pointing accuracy (deg)	8.94	6.14
Pointing stability (deg/sec)	4.55	0.111
Roll rate limit (deg/sec)	4.55	0.111
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	8.90	5.4
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1
Spatial resolution (m)	2.24 E 05	1.53 E 08
Angular resolution (deg)	0.0168	5.4
Exposure time (sec)	-	-
Field/view length (km)	2.24 E 02	1.53 E 05
Swath width (km)	2.24 E 02	1.53 E 05
Area/frame (%)	5.0 E-04	36.8
Total area (%)	38.3	36.8
Total sensor worth	5.0 E-09	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed.



Sensor Support Requirements Summary

Sheet Number 21-2

VISIBLE/UV

Sensor type SPECTROMETER Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-5.39 E 04	-8.25 E 04
Latitude (deg)	5.55	6.5
Longitude (deg)	46.4	-37.6
Sun angle (deg)	23.4	18.5
Support requirements		
Mass (kg)	888.7	2.08
Average power (w)	4.20	4.20
Length (m)	4.41	0.21
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	4.05	1.67 E-03
Data rate (bit/sec)	1.62 E 04	0.404
Pointing accuracy (deg)	9.0	6.63
Pointing stability (deg/sec)	3.8	0.091
Roll rate limit (deg/sec)	3.8	0.091
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	8.90	5.4
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0E-05	0.1
Spatial resolution (m)	2.34 E+05	2.1 E 08
Angular resolution (deg)	0.0168	5.4
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	1.2 E-04	50.0
Total area (%)	67.1	50.0
Total sensor worth	1.1 E-08	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed



Sensor Support Requirements Summary

VISIBLE/UV Sheet Number 21-3

Sensor type SPECTROMETER Mission number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-2.28 E 04	-4.2 E 04
Latitude (deg)	1.32	2.0
Longitude (deg)	142.1	-105.0
Sun angle (deg)	22.5	10.0
Support requirements		
Mass (kg)	820.4	2.12
Average power (w)	4.2	4.2
Length (m)	2.91	0.20
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	2.52	1.60 E-03
Data rate (bit/sec)	3.58 E 03	0.452
Pointing accuracy (deg)	14.86	6.52
Pointing stability (deg/sec)	3.77	0.108
Roll rate limit (deg/sec)	3.77	0.108
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	14.0	5.73
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0E-05	0.1
Spatial resolution (m)	6.33 E 05	1.38 E 08
Angular resolution (deg)	0.03	5.73
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	6.28 E-04	37.3
Total area (%)	20.3	37.3
Total sensor worth	2.2 E-09	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed

Sensor Support Requirements Summary

Sheet Number 21-4

Sensor type VISIBLE/UV SPECTROMETER Mission number 9 Planet URANUS

Observation objectives:

SD 70-24 Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-2.68 E 04	-4.3 E 04
Latitude (deg)	75.4	79.2
Longitude (deg)	-70.7	100.9
Sun angle (deg)	10.2	5.2
Support requirements		
Mass (kg)	820.4	2.12
Average power (w)	4.2	4.2
Length (m)	2.91	0.20
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	2.52	1.61 E-03
Data rate (bit/sec)	1.49 E 04	0.0507
Pointing accuracy (deg)	7.58	5.17
Pointing stability (deg/sec)	0.479	0.012
Roll rate limit (deg/sec)	0.479	0.012
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	14.0	5.73
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1
Spatial resolution (m)	4.77 E 05	1.62 E 08
Angular resolution (deg)	0.03	5.73
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	3.20 E-03	50.0
Total area (%)	64.1	50.0
Total sensor worth	7.9 E-10	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed



Sensor Support Requirements Summary

VISIBLE/UV Sheet Number 21-5

Sensor type SPECTROMETER Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-2.34 E 04	-3.24 E 04
Latitude (deg)	-30.0	-30.0
Longitude (deg)	47.3	130.0
Sun angle (deg)	23.4	21.0
Support requirements		
Mass (kg)	820.4	2.12
Average power (w)	4.2	4.2
Length (m)	2.91	0.20
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	2.52	1.60 E-03
Data rate (bit/sec)	1.62 E 04	0.0145
Pointing accuracy (deg)	7.24	5.18
Pointing stability (deg/sec)	0.96	0.0345
Roll rate limit (deg/sec)	0.96	0.0345
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	14.0	5.73
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1
Spatial resolution (m)	4.66 E 05	1.49 E 08
Angular resolution (deg)	0.03	5.73
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	3.51 E-03	25.2
Total area (%)	37.4	25.2
Total sensor worth	4.35 E-09	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed.



Sensor Support Requirements Summary

Sheet Number 21-6

Sensor type VISIBLE/UV SPECTROMETER Mission number 12 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - _____	Worth = _____
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-3.44 E 04	-4.73 E 04
Latitude (deg)	-4.39	-3.42
Longitude (deg)	-79.6	41.1
Sun angle (deg)	32.0	22.0
Support requirements		
Mass (kg)	974.4	2.08
Average power (w)	4.2	4.2
Length (m)	5.98	0.207
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	5.66	1.67 E-03
Data rate (bit/sec)	1.83 E 04	0.475
Pointing accuracy (deg)	9.22	6.14
Pointing stability (deg/sec)	6.14	0.107
Roll rate limit (deg/sec)	6.14	0.107
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	8.6	5.4
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1
Spatial resolution (m)	4.01 E 05	1.38 E 08
Angular resolution (deg)	0.0115	5.4
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	2.52 E-04	36.8
Total area (%)	41.9	36.8
Total sensor worth	5.6 E-09	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed.



Sensor Support Requirements Summary

VISIBLE/UV

Sheet Number 21-7

Sensor type SPECTROMETER Mission number 12 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	-3.99 E 04	-5.66 E 04
Latitude (deg)	-16.2	-2.9
Longitude (deg)	-51.7	130.1
Sun angle (deg)	35.5	17.0
Support requirements		
Mass (kg)	974.4	2.08
Average power (w)	4.2	4.2
Length (m)	5.98	0.207
Width (m)	1.0	0.1
Height (m)	1.0	0.1
Volume (m ³)	5.66	1.67 E-03
Data rate (bit/sec)	2.19 E 04	0.482
Pointing accuracy (deg)	8.45	6.63
Pointing stability (deg/sec)	4.89	0.108
Roll rate limit (deg/sec)	4.89	0.108
Scan rate limit (deg/sec)	7.82 E 03	7.82 E 04
Scan amplitude (deg)	8.6	5.4
Collecting Optics Diameter	1.0	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1
Spatial resolution (m)	4.15 E 05	1.54 E 08
Angular resolution (deg)	0.0115	5.4
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (°)	3.77 E-04	50.0
Total area (°)	57.8	50.0
Total sensor worth	9.55 E-09	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier

*Extreme of all requirements not necessarily incurred at point listed



Sensor Support Requirements Summary

Sheet Number 21-8

Sensor type VISIBLE/UV SPECTROMETER Orbit number 1 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal	
Trajectory points			
Point	2	2	3
Characteristics	Max. Alt.	Max. Alt.	Min. Alt.
Time to periapsis (sec)	7.11 E 04	7.11 E 04	1.3 E 04
Latitude (deg)	34	34	-78.1
Longitude (deg)	30	30	180.1
Sun angle (deg)	51	51	78.3
Support requirements			
Mass (kg)	166.9	2.12	
Average power (w)	4.2	4.2	
Length (m)	5.3	0.2	
Width (m)	0.5	0.1	
Height (m)	0.5	0.1	
Volume (m ³)	1.3	1.6 E-03	
Data rate (bit/sec)	1.76 E 04	0.12	
Pointing accuracy (deg)	15.97	13.3	
Pointing stability (deg/sec)	1.4	0.18	
Roll rate limit (deg/sec)	1.4	0.18	
Scan rate limit (deg/sec)	1.56 E 04	7.8 E 04	
Scan amplitude (deg)	14.8	11.46	
Collecting optics diameter (m)	0.5	0.1	
Capability parameters			
Maximum wavelength (λ_M) (μ)	1.0	0.7	
Minimum wavelength (λ_m) (μ)	0.1	0.12	
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1	
Spatial resolution (m)	1.0 E 05	7.98 E 07	
Angular resolution (deg)	0.012	5.73	
Exposure time (sec)	-	-	
Field/view length (km)	-	-	
Swath width (km)	-	-	
Area/frame (%)	5.23 E-05	1.2	
Total area (%)	15.4	12.3	
Total sensor worth	6.84 E-10	0.0	
Notes: Number of detectors	2	2	
Number of mirror faces	1	1	
Detector type	Photomultiplier	Photomultiplier	

Sensor Support Requirements Summary

Sheet Number 21-9

Sensor type VISIBLE/UV SPECTROMETER Orbit number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.95

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal	
Trajectory points			
Point	2	2	3
Characteristics	Max. Alt.	Max. Alt.	Min. Alt.
Time to periapsis (sec)	2.13 E 05	2.13 E 05	4.4 E 05
Latitude (deg)	-3.5	-3.5	77.5
Longitude (deg)	350.5	350.5	265
Sun angle (deg)	80	80	80
Support requirements			
Mass (kg)	1215	1.96	
Average power (w)	4.2	4.2	
Length (m)	10.3	0.24	
Width (m)	1.0	0.1	
Height (m)	1.0	0.1	
Volume (m ³)	10.0	0.002	
Data rate (bit/sec)	1.6 E 04	0.013	
Pointing accuracy (deg)	5.9	9.06	
Pointing stability (deg/sec)	0.16	0.061	
Roll rate limit (deg/sec)	0.16	4.9 E-02	
Scan rate limit (deg/sec)	7820.4	7.82 E 04	
Scan amplitude (deg)	5.8	8.48	
Collecting optics diameter (m)	1.0	0.1	
Capability parameters			
Maximum wavelength (λ_M) (μ)	1.0	0.7	
Minimum wavelength (λ_m) (μ)	0.1	0.12	
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1	
Spatial resolution (m)	1.46 E 05	2.4 E 08	
Angular resolution (deg)	0.0062	4.24	
Exposure time (sec)	-	-	
Field/view length (km)	-	-	
Swath width (km)	-	-	
Area/frame (%)	1.8 E-04	2.2	
Total area (%)	11.1	16.3	
Total sensor worth	6.84 E-10	0.0	
Notes: Number of detectors	2	2	
Number of mirror faces	1	1	
Detector type	Photomultiplier	Photomultiplier	

Sensor Support Requirements Summary

Sheet Number 21-10

VISIBLE/UV

Sensor type SPECTROMETER Orbit number 11 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>92</u>	Worth = <u>0.50</u>	Page C - <u>104</u>	Worth = <u>0.60</u>
	Page C - <u>96</u>	Worth = <u>0.55</u>	Page C - _____	Worth = _____
	Page C - <u>97</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - <u>98</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____
	Page C - <u>99</u>	Worth = <u>0.30</u>	Page C - _____	Worth = _____

Total observation worth = 2.95

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	2	3
Characteristics	Max. Alt.	Min. Alt.
Time to periapsis (sec)	1.24 E 05	2.2 E 05
Latitude (deg)	41.3	-77.1
Longitude (deg)	210	335.5
Sun angle (deg)	54.6	77.5
Support requirements		
Mass (kg)	193	2.12
Average power (w)	4.2	4.2
Length (m)	7.2	0.2
Width (m)	0.5	0.1
Height (m)	0.5	0.1
Volume (m ³)	1.77	0.0016
Data rate (bit/sec)	9.65 E 03	0.062
Pointing accuracy (deg)	12.6	13.4
Pointing stability (deg/sec)	0.98	0.052
Roll rate limit (deg/sec)	0.98	0.052
Scan rate limit (deg/sec)	1.56 E 04	7.8 E 04
Scan amplitude (deg)	11.4	
Collecting optics diameter (m)	0.5	0.1
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.0	0.7
Minimum wavelength (λ_m) (μ)	0.1	0.12
Spectral resolution ($\Delta\lambda$) (μ)	1.0 E-05	0.1
Spatial resolution (m)	1.0 E 05	1.6 E 08
Angular resolution (deg)	0.0086	5.73
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	8.2 E-05	5.81
Total area (%)	15.8	18.9
Total sensor worth	1.37 E-09	0.0
Notes: Number of detectors	2	2
Number of mirror faces	1	1
Detector type	Photomultiplier	Photomultiplier



Sensor Support Requirements Summary

Sheet Number 22-1

Sensor type LASER RADAR Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>57</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.90

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal

Trajectory points

Point	1
Characteristics	Max. Alt.
Time to periapsis (sec)	-3.31 E 03
Latitude (deg)	-30.0
Longitude (deg)	86.6
Sun angle (deg)	54.4

Support requirements

Mass (kg)	315.2
Average power (w)	331.2
Length (m)	0.25
Width (m)	0.54
Height (m)	0.54
Volume (m ³)	2.5 E-03
Data rate (bit/sec)	11.67
Pointing accuracy (deg)	3.87 E-03
Pointing stability (deg/sec)	3.87 E 03
Roll rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-
Scan amplitude (deg)	-

(Same)

Capability parameters

Maximum wavelength (λ_M) (μ)	1.06
Minimum wavelength (λ_m) (μ)	1.06
Spectral resolution ($\Delta\lambda$)	-
Spatial resolution (m)	1.21 E 04
Angular resolution (deg)	0.0114
Exposure time (sec)	-
Field/view length (km)	12.10
Swath width (km)	12.10
Area/frame (%)	1.99 E-04
Total area (%)	1.16

Total sensor worth	2.14 E-14
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Notes: Telescope magnification	20.0
Pulse energy limit (joules)	1.0 E 03
Laser efficiency (%)	5.0



Sensor Support Requirements Summary

Sheet Number 22-2

Sensor type LASER RADAR Mission number 3 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal

Trajectory points

Point	1
Characteristics	Max. Alt.
Time to periapsis (sec)	-6660.0
Latitude (deg)	20.22
Longitude (deg)	-88.03
Sun angle (deg)	20.6

Support requirements

Mass (kg)	316.2
Average power (w)	333.3
Length (m)	0.25
Width (m)	0.54
Height (m)	0.54
Volume (m ³)	2.5 E-03
Data rate (bit/sec)	11.67
Pointing accuracy (deg)	3.87 E-03
Pointing stability (deg/sec)	3.87 E+03
Roll rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-
Scan amplitude (deg)	-

(Same)

Capability parameters

Maximum wavelength (λ_M) (μ)	1.06
Minimum wavelength (λ_m) (μ)	1.06
Spectral resolution ($\Delta\lambda$)	-
Spatial resolution (m)	7.54 E+03
Angular resolution (deg)	1.14 E-02
Exposure time (sec)	-
Field/view length (km)	7.54
Swath width (km)	7.54
Area/frame (%)	1.23 E-05
Total area (%)	0.18

Total sensor worth	4.52 E-18
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Notes: Telescope magnification	20.0
Pulse energy limit (joules)	1000.0
Laser efficiency (%)	5.0



Sensor Support Requirements Summary

Sheet Number 22-3

Sensor type LASER RADAR Mission number 6 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal

Trajectory points

Point	1
Characteristics	Max. Alt.
Time to periapsis (sec)	-4680.0
Latitude (deg)	-0.01
Longitude (deg)	98.83
Sun angle (deg)	7.6

Support requirements

Mass (kg)	316.23
Average power (w)	333.33
Length (m)	0.25
Width (m)	0.54
Height (m)	0.54
Volume (m ³)	0.0025
Data rate (bit/sec)	11.67
Pointing accuracy (deg)	3.87 E-03
Pointing stability (deg/sec)	3875.0
Roll rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-
Scan amplitude (deg)	-

(Same)

Capability parameters

Maximum wavelength (λ_M) (μ)	1.06
Minimum wavelength (λ_m) (μ)	1.06
Spectral resolution ($\Delta\lambda$)	-
Spatial resolution (m)	7.54 E+03
Angular resolution (deg)	0.0114
Exposure time (sec)	-
Field/view length (km)	7.54
Swath width (km)	7.54
Area/frame (%)	1.23 E-05
Total area (%)	0.34

Total sensor worth	7.91 E-17
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Notes: Telescope magnification	20.0
Pulse energy limit (joules)	1000.0
Laser efficiency (%)	5.0

Sensor Support Requirements Summary

Sheet Number 22-4

Sensor type LASER RADAR Mission number 6 Planet MERCURY

Observation objectives:

SD 70-24 Page C - <u>57</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
Page C - _____	Worth = _____	Page C - _____	Worth = _____
Page C - _____	Worth = _____	Page C - _____	Worth = _____
Page C - _____	Worth = _____	Page C - _____	Worth = _____
Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.90

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	
Characteristics	Max. Alt.	
Time to periapsis (sec)	-3774.0	
Latitude (deg)	8.73	
Longitude (deg)	85.16	
Sun angle (deg)	83.1	
Support requirements		
Mass (kg)	307.4	
Average power (w)	315.08	
Length (m)	0.25	
Width (m)	0.54	
Height (m)	0.54	
Volume (m ³)	2.5 E-03	
Data rate (bit/sec)	11.67	
Pointing accuracy (deg)	3.87 E-03	
Pointing stability (deg/sec)	3875.0	
Roll rate limit (deg/sec)	-	
Scan rate limit (deg/sec)	-	
Scan amplitude (deg)	-	
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	
Minimum wavelength (λ_m) (μ)	1.06	
Spectral resolution ($\Delta\lambda$)	-	
Spatial resolution (m)	1.26 E+04	
Angular resolution (deg)	1.14 E-02	
Exposure time (sec)	-	
Field/view length (km)	1.26 E+01	
Swath width (km)	1.26 E+01	
Area/frame (%)	2.16 E-04	
Total area (%)	0.65	
Total sensor worth	2.14 E-14	
Notes: Telescope magnification	20.0	
Pulse energy limit (joules)	1000.0	
Laser efficiency (%)	5.0	

(Same)



Sensor Support Requirements Summary

Sheet Number 22-5

Sensor type LASER RADAR Mission number 7 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal

Trajectory points

Point	1
Characteristics	Max. Alt.
Time to periapsis (sec)	-4.96 E 03
Latitude (deg)	-2.62
Longitude (deg)	-29.82
Sun angle (deg)	28.80

Support requirements

Mass (kg)	100.0
Average power (w)	83.33
Length (m)	0.25
Width (m)	0.54
Height (m)	0.54
Volume (m ³)	2.5 E-03
Data rate (bit/sec)	11.67
Pointing accuracy (deg)	3.87 E-03
Pointing stability (deg/sec)	3.87 E 03
Roll rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-
Scan amplitude (deg)	-

(Same)

Capability parameters

Maximum wavelength (λ_M) (μ)	1.06
Minimum wavelength (λ_m) (μ)	1.06
Spectral resolution ($\Delta\lambda$)	-
Spatial resolution (m)	2.24 E 04
Angular resolution (deg)	0.0114
Exposure time (sec)	-
Field/view length (km)	22.4
Swath width (km)	22.4
Area/frame (%)	7.9 E-05
Total area (%)	0.017

Total sensor worth 1.13 E-17

Notes: Telescope magnification	20.0
Pulse energy limit (joules)	100.0
Laser efficiency (%)	2.0

Sensor Support Requirements Summary

Sheet Number 22-6

Sensor type LASER RADAR Mission number 7 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	
Characteristics	Max. Alt.	
Time to periapsis (sec)	-8.75 E 03	
Latitude (deg)	-3.85	
Longitude (deg)	10.05	
Sun angle (deg)	68.10	
Support requirements		
Mass (kg)	100.0	
Average power (w)	83.33	
Length (m)	0.25	
Width (m)	0.54	
Height (m)	0.54	
Volume (m ³)	2.5 E-03	
Data rate (bit/sec)	11.67	
Pointing accuracy (deg)	3.87 E-03	
Pointing stability (deg/sec)	3.87 E 03	
Roll rate limit (deg/sec)	-	
Scan rate limit (deg/sec)	-	
Scan amplitude (deg)	-	(Same)
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	
Minimum wavelength (λ_m) (μ)	1.06	
Spectral resolution ($\Delta\lambda$)	-	
Spatial resolution (m)	3.10 E 04	
Angular resolution (deg)	0.0114	
Exposure time (sec)	-	
Field/view length (km)	31.0	
Swath width (km)	31.0	
Area/frame (%)	2.13 E-6	
Total area (%)	0.028	
Total sensor worth	2.26 E-17	
Notes: Telescope magnification	20.0	
Pulse energy limit (joules)	100.0	
Laser efficiency (%)	2.0	



Sensor Support Requirements Summary

Sheet Number 22-7

Sensor type LASER RADAR Mission number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.50

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	
Characteristics	Max. Alt.	
Time to periapsis (sec)	-1.74 E 04	
Latitude (deg)	0.87	
Longitude (deg)	96.88	
Sun angle (deg)	32.40	
Support requirements		
Mass (kg)	316.23	
Average power (w)	333.33	
Length (m)	0.25	
Width (m)	0.54	
Height (m)	0.54	
Volume (m ³)	2.5 E-03	
Data rate (bit/sec)	11.67	
Pointing accuracy (deg)	3.87 E-03	
Pointing stability (deg/sec)	3.87 E 03	
Roll rate limit (deg/sec)	-	
Scan rate limit (deg/sec)	-	
Scan amplitude (deg)	-	
Capability parameters		(Same)
Maximum wavelength (λ_M) (μ)	1.06	
Minimum wavelength (λ_m) (μ)	1.06	
Spectral resolution ($\Delta\lambda$)	-	
Spatial resolution (m)	8.37 E 04	
Angular resolution (deg)	0.0114	
Exposure time (sec)	-	
Field/view length (km)	83.7	
Swath width (km)	83.7	
Area/frame (%)	1.10 E-5	
Total area (%)	0.27	
Total sensor worth	1.13 E-17	
Notes: Telescope magnification	20.0	
Pulse energy limit (joules)	1.0 E 03	
Laser efficiency (%)	5.0	

Sensor Support Requirements Summary

Sheet Number 22-8

Sensor type LASER RADAR Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal

Trajectory points

Point	1
Characteristics	Max. Alt.
Time to periapsis (sec)	-4.45 E 04
Latitude (deg)	79.21
Longitude (deg)	100.91
Sun angle (deg)	5.2

Support requirements

Mass (kg)	312.11
Average power (w)	324.71
Length (m)	0.25
Width (m)	0.54
Height (m)	0.54
Volume (m ³)	2.5 E-03
Data rate (bit/sec)	11.67
Pointing accuracy (deg)	3.87 E-03
Pointing stability (deg/sec)	3.87 E 03
Roll rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-
Scan amplitude (deg)	-

(Same)

Capability parameters

Maximum wavelength (λ_M) (μ)	1.06
Minimum wavelength (λ_m) (μ)	1.06
Spectral resolution ($\Delta\lambda$)	-
Spatial resolution (m)	1.78 E 05
Angular resolution (deg)	0.0114
Exposure time (sec)	-
Field/view length (km)	178.0
Swath width (km)	178.0
Area/frame (%)	4.48 E-04
Total area (%)	5.8

Total sensor worth 1.13 E-15

Notes: Telescope magnification	20.0
Pulse energy limit (joules)	1.0 E 03
Laser efficiency (%)	5.0



Sensor Support Requirements Summary

Sheet Number 22-9

Sensor type LASER RADAR Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	
Characteristics	Max. Alt.	
Time to periapsis (sec)	-5.21 E 04	
Latitude (deg)	-30.0	
Longitude (deg)	-138.0	
Sun angle (deg)	18.40	
Support requirements		
Mass (kg)	310.06	
Average power (w)	320.45	
Length (m)	0.25	
Width (m)	0.54	
Height (m)	0.54	
Volume (m ³)	2.5 E-03	
Data rate (bit/sec)	11.67	
Pointing accuracy (deg)	3.87 E-03	
Pointing stability (deg/sec)	3.87 E 03	
Roll rate limit (deg/sec)	-	
Scan rate limit (deg/sec)	-	
Scan amplitude (deg)	-	
Capability parameters		(Same)
Maximum wavelength (λ_M) (μ)	1.06	
Minimum wavelength (λ_m) (μ)	1.06	
Spectral resolution ($\Delta\lambda$)	-	
Spatial resolution (m)	2.95 E 05	
Angular resolution (deg)	0.0114	
Exposure time (sec)	-	
Field/view length (km)	295.0	
Swath width (km)	295.0	
Area/frame (%)	1.42 E-03	
Total area (%)	17.9	
Total sensor worth	2.26 E-15	
Notes: Telescope magnification	20.0	
Pulse energy limit (joules)	1.0 E 03	
Laser efficiency (%)	5.0	



Sensor Support Requirements Summary

Sheet Number 22-10

Sensor type LASER RADAR Mission number 12 Planet SATURN

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.50</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.50

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal

Trajectory points

Point	1
Characteristics	Max. Alt.
Time to periapsis (sec)	-1.45 E 04
Latitude (deg)	-38.20
Longitude (deg)	87.10
Sun angle (deg)	64.60

Support requirements

Mass (kg)	316.23
Average power (w)	333.33
Length (m)	0.25
Width (m)	0.54
Height (m)	0.54
Volume (m ³)	2.5 E-03
Data rate (bit/sec)	11.67
Pointing accuracy (deg)	3.87 E-03
Pointing stability (deg/sec)	3.87 E 03
Roll rate limit (deg/sec)	-
Scan rate limit (deg/sec)	-
Scan amplitude (deg)	-

(Same)

Capability parameters

Maximum wavelength (λ_M) (μ)	1.06
Minimum wavelength (λ_m) (μ)	1.06
Spectral resolution ($\Delta\lambda$)	-
Spatial resolution (m)	9.8 E 04
Angular resolution (deg)	0.0114
Exposure time (sec)	-
Field/view length (km)	98.0
Swath width (km)	98.0
Area/frame (%)	2.13 E-5
Total area (%)	0.42

Total sensor worth 1.13 E-17

Notes: Telescope magnification	20.0
Pulse energy limit (joules)	1.0 E 03
Laser efficiency (%)	5.0

Sensor Support Requirements Summary

Sheet Number 22-11

Sensor type LASER RADAR Orbit number 1 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>57</u>	Worth = <u>0.9</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.9

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	3.48 E 03	3.48 E 03
Latitude (deg)	88.9	88.9
Longitude (deg)	62.7	62.7
Sun angle (deg)	89.3	89.3
Support requirements		
Mass (kg)	116	116
Average power (w)	44.9	44.9
Length (m)	0.25	0.25
Width (m)	0.54	54
Height (m)	0.54	54
Volume (m ³)	2.5 E-03	2.5 E-03
Data rate (bit/sec)	11.67	11.67
Pointing accuracy (deg)	5.73 E-02	5.73 E-02
Pointing stability (deg/sec)	0.3	0.3
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	1.06
Minimum wavelength (λ_m) (μ)	1.06	1.06
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	1.0 E 03	1.0 E 03
Angular resolution (deg)	0.114	0.114
Exposure time (sec)	-	-
Field/view length (km)	1.0	1.0
Swath width (km)	1.0	1.0
Area/frame (%)	1.36 E-06	1.36 E-06
Total area (%)	2.3 E-02	2.3 E-02
Total sensor worth	2.14 E-05	2.14 E-05
Notes: Tele mag	20	20
Pulse energy limit (joules)	1.0 E 03	1.0 E 03
Laser efficiency (%)	5.0	5.0

Sensor Support Requirements Summary

Sheet Number 22-12

Sensor type LASER RADAR Orbit number 10 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>57</u>	Worth = <u>0.9</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.9

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	5.4 E 03	5.4 E 03
Latitude (deg)	-51.3	-51.3
Longitude (deg)	326.6	326.6
Sun angle (deg)	64.7	64.7
Support requirements		
Mass (kg)	314	314
Average power (w)	328.9	328.9
Length (m)	0.25	0.25
Width (m)	0.54	54
Height (m)	0.54	54
Volume (m ³)	2.5 E-03	2.5 E-03
Data rate (bit/sec)	11.67	11.67
Pointing accuracy (deg)	5.7 E-03	5.7 E-03
Pointing stability (deg/sec)	1.1 E-03	1.1 E-03
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	1.06
Minimum wavelength (λ_m) (μ)	1.06	1.06
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	1.0 E 03	1.0 E 03
Angular resolution (deg)	0.0114	0.0114
Exposure time (sec)	-	-
Field/view length (km)	1.0	1.0
Swath width (km)	1.0	1.0
Area/frame (%)	1.36 E-06	1.36 E-06
Total area (%)	9.2 E-03	9.2 E-03
Total sensor worth	2.14 E-05	2.14 E-05
Notes: Tele mag	20	20
Pulse energy limit (joules)	1.0 E 03	1.0 E 03
Laser efficiency (%)	5.0	5.0



Sensor Support Requirements Summary

Sheet Number 22-13

Sensor type LASER RADAR Orbit number 1 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.5</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.5

Capability level	Maximum Optimal	Minimum Marginal
Observation requirements level		
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	3.0 E 03	3.0 E 03
Latitude (deg)	7.0	7.0
Longitude (deg)	104	104
Sun angle (deg)	132.8	132.8
Support requirements		
Mass (kg)	100	100
Average power (w)	83.3	83.3
Length (m)	0.25	0.25
Width (m)	0.54	54
Height (m)	0.54	54
Volume (m ³)	2.5 E-03	2.5 E-03
Data rate (bit/sec)	11.67	11.67
Pointing accuracy (deg)	4.7 E-02	4.7 E-02
Pointing stability (deg/sec)	0.27	0.27
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	1.06
Minimum wavelength (λ_m) (μ)	1.06	1.06
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	745	745
Angular resolution (deg)	0.094	0.094
Exposure time (sec)	-	-
Field/view length (km)	0.745	0.745
Swath width (km)	0.745	0.745
Area/frame (%)	12 E-08	12 E-08
Total area (%)	6.3 E-03	6.3 E-03
Total sensor worth	1.63 E-12	1.63 E-12
Notes: Tele mag	20	20
Pulse energy limit (joules)	100	100
Laser efficiency (%)	2.0	2.0

Sensor Support Requirements Summary

Sheet Number 22-14

Sensor type LASER RADAR Orbit number 9 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>66</u>	Worth = <u>0.5</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.5

Capability level	Maximum Optimal	Minimum Marginal
Observation requirements level		
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	1.26 E 03	1.26 E 03
Latitude (deg)	69.8	69.8
Longitude (deg)	284	284
Sun angle (deg)	76.4	76.4
Support requirements		
Mass (kg)	100	100
Average power (w)	83.3	83.3
Length (m)	0.25	0.25
Width (m)	0.54	54
Height (m)	0.54	54
Volume (m ³)	2.5 E-03	2.5 E-03
Data rate (bit/sec)	11.67	11.67
Pointing accuracy (deg)	5.75 E-03	5.75 E-03
Pointing stability (deg/sec)	4.07 E-03	4.07 E-03
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	1.06
Minimum wavelength (λ_m) (μ)	1.06	1.06
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	745	745
Angular resolution (deg)	0.0115	0.0115
Exposure time (sec)	-	-
Field/view length (km)	0.745	0.745
Swath width (km)	0.745	0.745
Area/frame (%)	12 E-08	12 E-08
Total area (%)	9.5 E-04	9.5 E-04
Total sensor worth	1.13 E-12	1.13 E-12
Notes: Tele mag	20	20
Pulse energy limit (joules)	100	100
Laser efficiency (%)	2.0	2.0

Sensor Support Requirements Summary

Sheet Number 22-15

Sensor type LASER RADAR Orbit number 1 Planet MARS

Observation objectives:

SD 70-24	Page C - <u>57</u>	Worth = <u>0.9</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 1.4

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	4.4 E 03	4.4 E 03
Latitude (deg)	83	83
Longitude (deg)	298.5	298.5
Sun angle (deg)	108.1	108.1
Support requirements		
Mass (kg)	97.98	97.98
Average power (w)	32	32
Length (m)	0.25	0.25
Width (m)	0.54	54
Height (m)	0.54	54
Volume (m ³)	2.5 E-03	2.5 E-03
Data rate (bit/sec)	11.67	11.67
Pointing accuracy (deg)	0.028	0.028
Pointing stability (deg/sec)	0.073	0.073
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	1.06
Minimum wavelength (λ_m) (μ)	1.06	1.06
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	1 E 03	1 E 03
Angular resolution (deg)	0.056	0.056
Exposure time (sec)	-	-
Field/view length (km)	1.0	1.0
Swath width (km)	1.0	1.0
Area/frame (%)	6.75 x 10 ⁻⁷	6.75 x 10 ⁻⁷
Total area (%)	0.015	0.015
Total sensor worth	1.05 E-11	1.05 E-11
Notes: Tele mag	20	20
Pulse energy limit (joules)	1.0 E 03	1.0 E 03
Laser efficiency	5.0	5.0



Sensor Support Requirements Summary

Sheet Number 22-16

Sensor type LASER RADAR Orbit number 8 Planet MARS

Observation objectives:

SD 70-24	Page C - <u>57</u>	Worth = <u>0.5</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 1.4

Capability level	Maximum Optimal	Minimum Marginal
Observation requirements level		
Trajectory points		
Point	1	1
Characteristics	Max. Alt.	Max. Alt.
Time to periapsis (sec)	1.5 E 04	1.5 E 04
Latitude (deg)	22.8	22.8
Longitude (deg)	244.4	244.4
Sun angle (deg)	85.7	85.7
Support requirements		
Mass (kg)	243.7	243.7
Average power (w)	197.9	197.9
Length (m)	0.25	0.25
Width (m)	0.54	54
Height (m)	0.54	54
Volume (m ³)	2.5 E-03	2.5 E-03
Data rate (bit/sec)	11.67	11.67
Pointing accuracy (deg)	5.7 E-03	5.7 E-03
Pointing stability (deg/sec)	1.2 E-03	1.2 E-03
Roll rate limit (deg/sec)	-	-
Scan rate limit (deg/sec)	-	-
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (μ)	1.06	1.06
Minimum wavelength (λ_m) (μ)	1.06	1.06
Spectral resolution ($\Delta\lambda$) (μ)	-	-
Spatial resolution (m)	2.5 E 03	2.5 E 03
Angular resolution (deg)	0.0114	0.0114
Exposure time (sec)	-	-
Field/view length (km)	2.5	2.5
Swath width (km)	2.5	2.5
Area/frame (%)	0.027	0.027
Total area (%)	4.37 E-06	4.37 E-06
Total sensor worth	4.65 E-12	4.65 E-12
Notes: Tele mag	20	20
Pulse energy limit (joules)	1.0 E 03	1.0 E 03
Laser efficiency (%)	5.0	5.0



Sensor Support Requirements Summary

Sheet Number 23-1

RADIO
Sensor type OCCULTATION Mission number 3 Planet VENUS

Observation objectives:

SD 70-24 Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - _____	Worth = _____
Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - _____	Worth = _____
Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 2.85

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	-420.0	648.0
Latitude (deg)	-12.5	-26.0
Longitude (deg)	-17.0	27.0
Sun angle (deg)	68.0	110.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	87.5	0.063
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	1.26E-03	1.75E-03
Pitch rate limit (deg/sec)	1.26E-03	1.75E-03
Yaw rate limit (deg/sec)	1.26E-03	1.75E-03
Scan amplitude (deg)		
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		



Sensor Support Requirements Summary

Sheet Number 23-2

RADIO

Sensor type OCCULTATION Mission number 6 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level	Maximum Optimal	Minimum Marginal
Observation requirements level		
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	252.0	406.8
Latitude (deg)	46.5	38.8
Longitude (deg)	-35.0	-47.0
Sun angle (deg)	122.0	134.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	58.7	0.049
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	9.75E-04	1.17E-03
Pitch rate limit (deg/sec)	9.75E-04	1.17E-03
Yaw rate limit (deg/sec)	9.75E-04	1.17E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation.		



Sensor Support Requirements Summary

Sheet Number 23-3

RADIO

Sensor type OCCULTATION Mission number 7 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	1.8E03	6.48E03
Latitude (deg)	-3.4	1.6
Longitude (deg)	21.0	25.0
Sun angle (deg)	150.0	162.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	247.6	0.165
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	9.9E-04	1.48E-03
Pitch rate limit (deg/sec)	9.9E-04	1.48E-03
Yaw rate limit (deg/sec)	9.9E-04	1.48E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.130	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		

Sensor Support Requirements Summary

Sheet Number 23-4

Sensor type RADIO OCCULTATION Mission number 7 Planet SATURN

Observation objectives:

SD 70-24 Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	529.2	5,544.0
Latitude (deg)	-0.122	-6.0
Longitude (deg)	3.1	3.7
Sun angle (deg)	150.3	159.2
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	225.8	0.137
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	8.25E-04	1.35E-03
Pitch rate limit (deg/sec)	8.25E-04	1.35E-03
Yaw rate limit (deg/sec)	8.25E-04	1.35E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		



Sensor Support Requirements Summary

Sheet Number 23-5

RADIO
Sensor type OCCULTATION Mission number 9 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	7560.0	1.4E04
Latitude (deg)	-2.6	-2.05
Longitude (deg)	-33.0	-70.0
Sun angle (deg)	162.0	174.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	228.4	0.175
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	1.05E-03	1.37E-03
Pitch rate limit (deg/sec)	1.05E-03	1.37E-03
Yaw rate limit (deg/sec)	1.05E-03	1.37E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		

Sensor Support Requirements Summary

Sheet Number 23-6

RADIO

Sensor type OCCULTATION Mission number 9 Planet URANUS

Observation objectives:

SD 70-24	Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - _____	Worth = _____
	Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - _____	Worth = _____
	Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
	Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = _____

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	6840.0	1.26E04
Latitude (deg)	-80.0	-77.0
Longitude (deg)	-132.5	97.0
Sun angle (deg)	173.0	172.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	74.76	0.051
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	4.36E-04	6.41E-04
Pitch rate limit (deg/sec)	4.36E-04	6.41E-04
Yaw rate limit (deg/sec)	4.36E-04	6.41E-04
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		



Sensor Support Requirements Summary

Sheet Number 23-7

RADIO
Sensor type OCCULTATION Mission number 9 Planet NEPTUNE

Observation objectives:

SD 70-24	Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	918.0	3,672.0
Latitude (deg)	20.1	29.9
Longitude (deg)	17.6	48.0
Sun angle (deg)	154.0	162.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	156.5	0.075
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	6.47E-04	1.34E-03
Pitch rate limit (deg/sec)	6.47E-04	1.34E-03
Yaw rate limit (deg/sec)	6.47E-04	1.34E-03
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		

Sensor Support Requirements Summary

Sheet Number 23-8

RADIO
 Sensor type OCCULTATION Mission number 12 Planet JUPITER

Observation objectives:

SD 70-24	Page C - <u>048</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>074</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>075</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>076</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Enter EO	Exit EO
Time to periapsis (sec)	5.58E04	6.85E04
Latitude (deg)	1.70	2.4
Longitude (deg)	20.0	110.0
Sun angle (deg)	174.0	168.0
Support requirements		
Mass (kg)	1658.0	(Same)
Average power (w)	5.0	(Same)
Length (m)	14.94	(Same)
Width (m)	33.22	(Same)
Height (m)	33.22	(Same)
Volume (m ³)	164.8	(Same)
Data rate (bit/sec)	92.75	0.084
Pointing accuracy (deg)	0.06	(Same)
Pointing stability (deg/sec)	5.03E-04	5.57E-04
Pitch rate limit (deg/sec)	5.03E-04	5.57E-04
Yaw rate limit (deg/sec)	5.03E-04	5.57E-04
Scan amplitude (deg)	-	-
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	(Same)
Minimum wavelength (λ_m) (m)	0.13	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.92E-03	0.0
Notes: Vertical resolution (m)	1000.0	10,000.0
Phase shift precision (deg)	36.0	3,600.0
Intensity resolution (%)	2.1	26.0
*EO = Earth Occultation		



Sensor Support Requirements Summary

Sheet Number 23-9

Sensor type RADIO OCCULTATION Orbit number 1 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>48</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>74</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>75</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>76</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	2
Characteristics	Enter E0	Exit E0
Time to periapsis (sec)	2.28 E 03	780
Latitude (deg)	29.1	-48.4
Longitude (deg)	242.8	242.9
Sun angle (deg)	124.7	115.6
Support requirements		
Mass (kg)	1,681	1,681
Average power (w)	5.0	5.0
Length (m)	14.94	14.94
Width (m)	37.1	37.1
Height (m)	37.1	37.1
Volume (m ³)	165.1	165.1
Data rate (bit/sec)	15.2	0.015
Pointing accuracy (deg)	0.06	0.06
Pointing stability (deg/sec)	8.91 E-04	9.12 E-04
Pitch rate limit (deg/sec)	8.91 E-04	9.12 E-04
Yaw rate limit (deg/sec)	8.91 E-04	9.12 E-04
Scan amplitude (deg)		
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	1.11
Minimum wavelength (λ_m) (m)	0.13	0.13
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.87 E-03	0.0
Notes: Vertical resolution (m)	1,000	10,000
Phase shift precision (deg)	36	3,600
Intensity resolution (%)	2.1	26



Sensor Support Requirements Summary

Sheet Number 23-10

Sensor type RADIO OCCULTATION Orbit number 1 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>48</u>	Worth = <u>0.85</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>74</u>	Worth = <u>0.40</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>75</u>	Worth = <u>0.90</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u>76</u>	Worth = <u>0.70</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 2.85

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Enter E0	Exit E0
Time to periapsis (sec)	5.04 E 03	1.32 E 03
Latitude (deg)	-63.9	71.7
Longitude (deg)	283.9	284
Sun angle (deg)	72.5	77.6
Support requirements		
Mass (kg)	1,681	1,681
Average power (w)	5.0	5.0
Length (m)	14.94	14.94
Width (m)	37.1	37.1
Height (m)	37.1	37.1
Volume (m ³)	165.1	165.1
Data rate (bit/sec)	26.2	0.024
Pointing accuracy (deg)	0.06	0.06
Pointing stability (deg/sec)	4.74 E-04	5.24 E-04
Pitch rate limit (deg/sec)	4.74 E-04	5.24 E-04
Yaw rate limit (deg/sec)	4.74 E-04	5.24 E-04
Scan amplitude (deg)		
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	1.11
Minimum wavelength (λ_m) (m)	0.13	0.13
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.87 E-03	0.0
Notes: Vertical resolution (m)	1,000	10,000
Phase shift precision (deg)	36	3,600
Intensity resolution (%)	2.1	26

Sensor Support Requirements Summary

Sheet Number 23-11

Sensor type RADIO OCCULTATION Orbit number 9 Planet VENUS

Observation objectives:

SD 70-24	Page C - <u>48</u>	Worth = <u>0.85</u>	Page C - _____	Worth = _____
	Page C - <u>74</u>	Worth = <u>0.40</u>	Page C - _____	Worth = _____
	Page C - <u>75</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
	Page C - <u>76</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 2.85

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	1	2
Characteristics	Enter E0	Exit E0
Time to periapsis (sec)	6.3 E 04	780
Latitude (deg)	-54.3	48.6
Longitude (deg)	282.9	284
Sun angle (deg)	67	63.1
Support requirements		
Mass (kg)	1,681	1,681
Average power (w)	5.0	5.0
Length (m)	14.94	14.94
Width (m)	37.1	37.1
Height (m)	37.1	37.1
Volume (m ³)	165.1	165.1
Data rate (bit/sec)	68.6	0.023
Pointing accuracy (deg)	0.06	0.06
Pointing stability (deg/sec)	4.66 E-04	1.37 E-03
Pitch rate limit (deg/sec)	4.66 E-04	1.37 E-03
Yaw rate limit (deg/sec)	4.66 E-04	1.37 E-03
Scan amplitude (deg)		
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	1.11
Minimum wavelength (λ_m) (m)	0.13	0.13
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (%)		
Total area (%)		
Total sensor worth	1.87 E-03	0.0
Notes: Vertical resolution (m)	1,000	10,000
Phase shift precision (deg)	36	3,600
Intensity resolution (%)	2.1	26

Sensor Support Requirements Summary

Sheet Number 23-12

Sensor type RADIO OCCULTATION Orbit number 1 Planet MARS

Observation objectives:

SD 70-24	Page C - <u>48</u>	Worth = <u>0.85</u>	Page C - _____	Worth = _____
	Page C - <u>74</u>	Worth = <u>0.40</u>	Page C - _____	Worth = _____
	Page C - <u>75</u>	Worth = <u>0.90</u>	Page C - _____	Worth = _____
	Page C - <u>76</u>	Worth = <u>0.70</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 2.85

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	1	2
Characteristics	Enter E0	Exit E0
Time to periapsis (sec)	2.28 E 03	2.58 E 03
Latitude (deg)	-3.6	8.7
Longitude (deg)	307.2	306
Sun angle (deg)	87.2	91.1
Support requirements		
Mass (kg)	1,681	1,681
Average power (w)	5.0	5.0
Length (m)	14.94	14.94
Width (m)	37.1	37.1
Height (m)	37.1	37.1
Volume (m ³)	165.1	165.1
Data rate (bit/sec)	20.1	0.02
Pointing accuracy (deg)	0.06	0.06
Pointing stability (deg/sec)	2.4 E-04	2.41 E-04
Pitch rate limit (deg/sec)	2.4 E-04	2.41 E-04
Yaw rate limit (deg/sec)	2.4 E-04	2.41 E-04
Scan amplitude (deg)		
Capability parameters		
Maximum wavelength (λ_M) (m)	1.11	1.11
Minimum wavelength (λ_m) (m)	0.13	0.13
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)		
Angular resolution (deg)		
Exposure time (sec)		
Field/view length (km)		
Swath width (km)		
Area/frame (°)		
Total area (°)		
Total sensor worth	1.87 E-03	0.0
Notes: Vertical resolution (m)	1,000	10,000
Phase shift precision (deg)	36	3,600
Intensity resolution (%)	2.1	26



Sensor Support Requirements Summary

Sheet Number 26-1

Sensor type SOLID STATE TELESCOPE Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>42</u>	Worth = <u>0.79</u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>
	Page C - <u> </u>	Worth = <u> </u>	Page C - <u> </u>	Worth = <u> </u>

Total observation worth = 0.79

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	0.53	(Same)
Average power (w)	1.0	(Same)
Length (m)	0.011	(Same)
Width (m)	0.030	(Same)
Height (m)	0.030	(Same)
Volume (m ³)	2.51E-03	(Same)
Data rate (bit/sec)	100.0	(Same)
Pointing accuracy (deg)	5.0	(Same)
Pointing stability (deg/sec)	1.0	(Same)
Roll rate limit (deg/sec)	1.0	(Same)
Scan rate limit (deg/sec)	-	(Same)
Scan amplitude (deg)		-
Capability parameters		
Maximum energy (MeV)	30.0	(Same)
Minimum energy (MeV)	5.0	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	-	-
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	-	-
Total sensor worth	0.79	0.79

Notes: Manual application of scaling law.

Table A-6. Other Applications of Solid State Telescope

Changes in Data

Mission No.	Planet	Item Changed	New Value
6	Mercury	None	--
Orbit 1	Mercury	None	--
Orbit 10	Mercury	None	--

Sensor Support Requirements Summary

Sheet Number 27-1

Sensor type Li⁶ I SPECTROMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>43</u>	Worth = <u>0.40</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.40

Capability level	Maximum	Minimum
Observation requirements level	Optimal	Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	0.9	(Same)
Average power (w)	2.0	(Same)
Length (m)	0.10	(Same)
Width (m)	0.12	(Same)
Height (m)	0.12	(Same)
Volume (m ³)	1.2E-03	(Same)
Data rate (bit/sec)	50.0	(Same)
Pointing accuracy (deg)	5.0	(Same)
Pointing stability (deg/sec)	1.0	(Same)
Roll rate limit (deg/sec)	1.0	(Same)
Scan rate limit (deg/sec)	1.0	(Same)
Scan amplitude (deg)	60.0	(Same)
Capability parameters		
Maximum energy (MeV)	3.0	(Same)
Minimum energy (eV)	0.02	(Same)
Spectral resolution ($\Delta\lambda$)	-	-
Spatial resolution (m)	-	-
Angular resolution (deg)	-	-
Exposure time (sec)	-	-
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	50.0	50.0
Total sensor worth	0.34	0.34

Notes: SO = Sun occultation
 Point design, manual calculation

Table A-7. Other Applications of Li⁶I Spectrometer

Changes in Data

Mission No.	Planet	Item Changed	New Value
6	Mercury	Trajectory points	All but SO*
6	Mercury	Scan amplitude	58.0
Orbit 1	Mercury	Trajectory points	All but SO
Orbit 1	Mercury	Scan amplitude	112.0
Orbit 10	Mercury	Trajectory points	All but SO
Orbit 10	Mercury	Scan amplitude	112.0
*SO = Sun occultation			



Sensor Support Requirements Summary

Sheet Number 28-1

CURVED PLATE PLASMA

Sensor type SPECTROMETER Mission number 2 Planet MERCURY

Observation objectives:

SD 70-24	Page C - <u>44</u>	Worth = <u>0.15</u>	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____
	Page C - _____	Worth = _____	Page C - _____	Worth = _____

Total observation worth = 0.15

Capability level Observation requirements level	Maximum Optimal	Minimum Marginal
Trajectory points		
Point	All	All
Characteristics		
Time to periapsis (sec)		
Latitude (deg)		
Longitude (deg)		
Sun angle (deg)		
Support requirements		
Mass (kg)	5.5	(Same)
Average power (w)	7.5	(Same)
Length (m)	0.13	(Same)
Width (m)	0.13	(Same)
Height (m)	0.15	(Same)
Volume (m ³)	2.5E-03	(Same)
Data rate (bit/sec)	512.0	(Same)
Pointing accuracy (deg)	3.0	(Same)
Pointing stability (deg/sec)	0.5	(Same)
Roll rate limit (deg/sec)	0.5	(Same)
Scan rate limit (deg/sec)	0.5	(Same)
Scan amplitude (deg)	120.0	20.0
Capability parameters		
Maximum wavelength (λ_M)	1000.0	(Same)
Minimum wavelength (λ_m)	100.0	(Same)
Spectral resolution ($\Delta\lambda$)	-	(Same)
Spatial resolution (m)	-	-
Angular resolution (deg)	-	-
Exposure time (sec)	0.01	1.0
Field/view length (km)	-	-
Swath width (km)	-	-
Area/frame (%)	-	-
Total area (%)	-	-
Total sensor worth	0.15	

Table A-8. Other Applications of Curved Plate Plasma Spectrometer

Changes in Data

Mission No.	Planet	Item Changed	New Value
6	Mercury	None	--
Orbit 1	Mercury	None	--
Orbit 10	Mercury	None	--